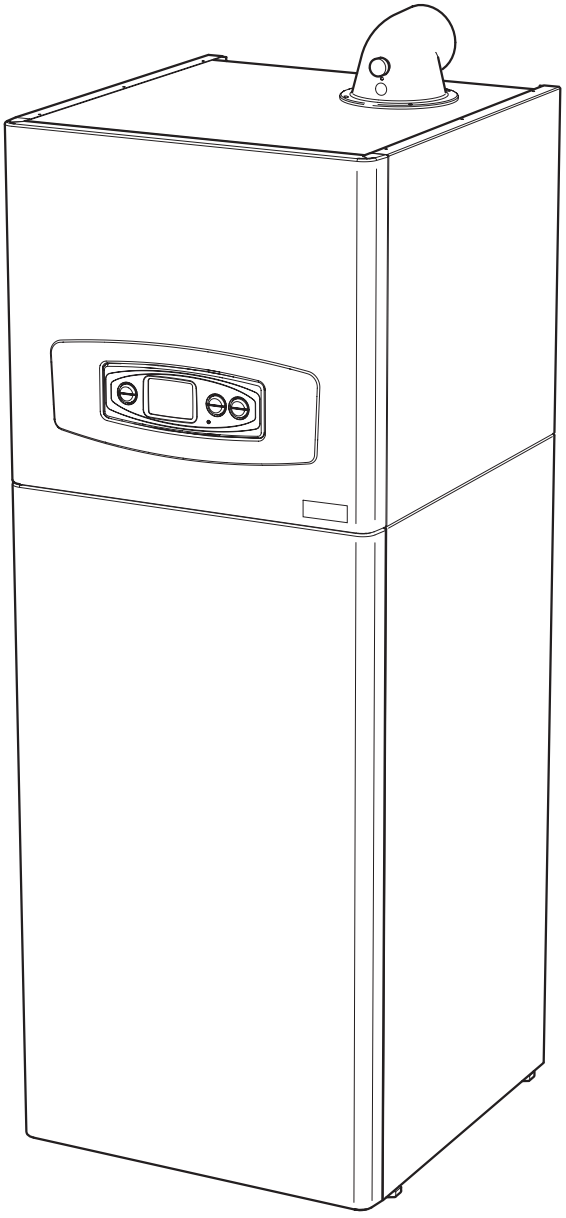
Glow-worm

Ultrapower sxi

Installation and Servicing



100sxi

G.C. No. 41-019-09

170sxi

G.C. No. 41-019-10

High Efficiency System Store

Guarantee Registration

Thank you for installing a new Glow-worm appliance in your home.
Glow-worm appliances are manufactured to the very highest standard so we are pleased to offer our customers a Comprehensive Guarantee.
This product is guaranteed for 24 months from the date of installation or 30 months from the date of manufacture, whichever is the shorter, for parts. In addition this product is guaranteed for 12 months from the date of installation or 18 months from the date of manufacture, whichever is the shorter, for labour.
The second year of the parts guarantee, from the beginning of the 13th month onwards after installation or manufacture, is conditional upon the boiler having been serviced by a **competent person** approved at the time by the Health and Safety Executive, in accordance with the manufacturer's recommendations. We strongly recommend regular servicing of your gas appliance, but where the condition is not met, any chargeable spare parts or components issued within the applicable guarantee period still benefit from a 12 month warranty from the date of issue by the manufacturer.
We recommend you complete and return as soon as possible your guarantee registration card.
If your guarantee registration card is missing you can obtain a copy or record your registration by telephoning the Glow-worm Customer Service number 01773 828100.
In addition Glow-worm offers a guarantee of 10 years for the stainless steel cylinder against faulty materials or manufacture provided that:
The following information is important as without it your guarantee may be invalid.

1. The warranty will become invalid if the damage is due to scaling, frost damage, transient voltages, lightning strikes or any act of vandalism or misuse.
2. The proof of purchase must be produced in the event of any warranty claim (bill of sale).
3. The appliance must be installed by a **competent person** approved at the time by the Health and Safety Executive, to the prevailing standards, installation book and building regulations at the time of installation.
4. The "Benchmark" Installation, Commissioning and Service Record must be completed on installation and kept up to date.
5. The appliance must be serviced annually.
6. The installation must be in an appropriate location and its use is restricted to potable water (chloride levels less than 200 mg/l).
7. Tampering or modification will invalidate the warranty.
8. The guarantee card must be completed and returned to Glow-worm within 30 days of purchase.

PLEASE NOTE THIS EXTENDED GUARANTEE IS NOT TRANSFERABLE AND RESTS WITH THE ORIGINAL HOUSEHOLDER.

Customer Service: 01773 828300
Technical Helpline: 01773 828100

General and Sales enquiries:
Tel. 01773 824639 Fax: 01773 820569

To register your Glow-worm appliance call: 0800 0732142

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.
Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme.
Visit www.centralheating.co.uk for more information.

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

CE

These instructions consist of, Installation, Servicing, Fault Finding, Replacement of Parts and Spares. The instructions are an integral part of the appliance and must, to comply with the current issue of the Gas Safety (Installation and Use) Regulations, be handed to the user on completion of the installation.

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WARNINGS

Gas Leak or Fault

Turn off the gas emergency control valve immediately. Eliminate all sources of ignition, i.e.smoking, blowlamps, hot air guns etc.

Do not operate electrical lights or switches either on or off. Open all doors and windows, ventilate the area.

Metal Parts

This boiler contains metal parts (components) and care should be taken when handling and cleaning, with particular regard to edges.

Sealed Components

Under no circumstances must the User interfere with or adjust sealed parts.

Important Information

Gas Category

This boiler is for use only on G20 natural gas, but may be converted for use on G31 gas (Propane L.P.G.).

Gas Safety (Installation and Use) Regulations

In your own interests and that of safety, it is the Law that ALL gas appliances are installed by **competent person** approved at the time by the Health and Safety Executive in accordance with the current issue of the above regulations.

Control of Substances Hazardous to Health

Under Section 6 of The Health and Safety at Work Act 1974, we are required to provide information on substances hazardous to health.

The adhesives and sealants used in this appliance are cured and give no known hazard in this state.

Insulation Pads / Ceramic Fibre

These can cause irritation to skin, eyes and the respiratory tract.

If you have a history of skin complaint you may be susceptible to irritation. High dust levels are usual only if the material is broken.

Normal handling should not cause discomfort, but follow normal good hygiene and wash your hands before eating, drinking or going to the lavatory.

If you do suffer irritation to the eyes or severe irritation to the skin seek medical attention.

Manual Handling

With regards to the “Manual Handling Operations, 1992 Regulations”, it should be noted that each appliance module exceeds the recommended weight for a one person lift.

The handling of the boiler may involve lifting, pushing and pulling, the use of a sack truck may be required.

The following handling techniques and precautions should be considered:

- Grip the boiler at its base
- Be physically capable
- Use safety clothing where appropriate, e.g. gloves, safety footwear.

Ensure safe lifting techniques are used

- Keep back straight.
- Avoid twisting at the waist.
- Avoid upper body/top heavy bending.
- Always grip using the palm of the hand.
- Use designated hand holds.
- Keep load as close to body as possible.
- Always use assistance if required.

Electrical Supply

The electrical installation must be installed by a **competent person** approved at the time by the Health and Safety Executive and in accordance with the relevant standards.

The boiler and immersion heater must be earthed.

All system components shall be of an approved type and all wiring to current I.E.E. wiring regulations.

External wiring must be correctly earthed, polarised and in accordance with the relevant standards.

In GB this is BS 6891.

In IE this is the current edition of I.S.813 “Domestic Gas Installations”.

The boiler must be connected to a permanent 230V ac, 50Hz supply.

Connection of the whole electrical system of the boiler, including any heating controls, to the electrical supply must be through one common isolator and must be fused 3 Amp maximum.

Isolation should be by a double pole switched fused spur box, with a minimum gap of 3mm for both poles. The fused spur box should be readily accessible and preferably adjacent to the appliance. It should be identified as to its use.

Alternatively connection can be made through an unswitched shuttered socket and 3A fused 3-pin plug both to the current issue of BS 1363 may be used, provided they are not used in a room containing a bath or shower.

Wiring to the boiler must be PVC 85^{O}C insulated cable, not less than 0.75mm^{2} (24/0.20mm).

Immersion Heater - a thermostatically controlled immersion heater with manual reset is fitted to the cylinder as a back up for domestic hot water in the event of the boiler being inoperable. The immersion heater **MUST** be wired separately using 3kW 13amp wiring and in accordance with the relevant standards.

Statutory Requirements

Testing and Certification

This boiler is tested and certificated for safety and performance. It is, therefore, important that no alteration is made to the boiler, without permission, in writing, by Glow-worm.
Any alteration not approved by Glow-worm, could invalidate the certification, boiler warranty and may also infringe the current issue of the statutory requirements.

CE Mark

This boiler meets the requirements of Statutory Instrument, No. 3083 The Boiler (Efficiency) Regulations, and therefore is deemed to meet the requirements of Directive 92/42/EEC on the efficiency requirements for new hot water boilers fired with liquid or gaseous fuels.

Type test for purposes of Regulation 5 certified by: Notified body 0087.

Product/production certified by: Notified body 0086.

The CE mark on this appliance shows compliance with:

1. Directive 2009/142/EC on the approximation of the laws of the Member States relating to appliances burning gaseous fuels.

2. Directive 73/23/EEC on the harmonisation of the Laws of the Member States relating to electrical equipment designed for use within certain voltage limits.

3. Directive 89/336/EEC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.

IMPORTANT

Where no British Standards exists, materials and equipment should be fit for their purpose and of suitable quality and workmanship.
The installation of this boiler must be carried out by a **competent person** approved at the time by the Health and Safety Executive in accordance with the rules in force in the countries of destination.
Manufacturer's instructions must not be taken as overriding statutory requirements.

Statutory Requirements

Installation of this boiler falls within the scope of the current Building Regulations, Document G Sanitation, hot water safety and water efficiency. This requires that the installation of an unvented system should be notified to the local authority Building Control Department and that the work must be carried out by a **competent person** approved at the time by the Health and Safety Executive, as defined in the approved document G3.

In GB, the installation of the boiler must comply with the requirements of the current issue of BS6798 and be carried out by a **competent person** approved at the time by the Health and Safety Executive, as described in the following regulations:

The manufacturer's instructions supplied.

The Gas Safety (Installation and Use) Regulations.

The appropriate Buildings Regulations either The Building Regulations, The Building Regulations (Scotland),The Building Regulations (Northern Ireland).
The Water Supply (water fittings) Regulations 1999 and water byelaws 2000, Scotland.

The Health and Safety at Work Act, Control of Substances Hazardous to Health (COSHH).

The Current I.E.E. Wiring Regulations.

Where no specific instructions are given, reference should be made to the relevant British Standard Code of Practice.

In IE, the installation must be carried out by a **competent person** approved at the time by the Health and Safety Executive and installed in accordance with the current edition of I.S.813 "Domestic Gas Installations", the current Building Regulations and reference should be made to the current ETCI rules for Electrical Installation.

In GB, the following Codes of Practice apply:

BS4814, BS6798, BS5440 Part 1 and 2, BS5546 Part 1, BS5449, BS6891, BS6700, BS7074 Part 1 and 2, BS7593, BS7671.

In IE: I.S.813, BS5546, BS 5449, BS 7074, BS 7593.

NOTE: For further information, see the current issue of the Building Regulations, approved document L1 (in the UK) and the following current issues of:

1) Central heating system specification (CheSS)

2) Controls for domestic central heating system and hot water. BRECSU.

Gas Supply

The gas installation must be in accordance with the relevant standards.

In GB this is BS6891.

In IE this is the current edition of I.S.813 "Domestic Gas Installations".

The supply from the governed meter must be of adequate size to provide a steady inlet working pressure of 20mbar (8in wg) at the boiler.
On completion, test the gas installation for soundness using the pressure drop method and suitable leak detection fluid, purge in accordance with the above standard.

Domestic Hot Water

General - All domestic hot water circuits, connections, fittings must be in accordance with the relevant standards and water supply regulations.
For GB: Guidance G17 to G24 and recommendation R17 to R24 of the Water Regulations Guide (for Scotland, the Water Byelaws 2000, Scotland).
Document G Sanitation, hot water safety and water efficiency, section 3 of the building regulations, requires that the installation of an unvented system should be notified to the local authority Building Controls Department and that the work must be carried out by a competent person approved at the time by the Health and Safety Executive, as defined in the approved document G3.
For IE: The current edition of I.S.813 "Domestic Gas Installations".
Where a storage system will not have a vent to atmosphere the installation must comply with the building regulations and the Water Supply (water fittings) regulations 1999 and water byelaws 2000, Scotland, see also the current issue of BS5546 and BS6700.
If fitting to an existing system the local authority should be informed.

Heating System

In GB, it is necessary to comply with the Water Supply (Water Fittings) Regulations 1999 (for Scotland, the Water Byelaws 2000, Scotland).

To comply with the Water regulations your attention is drawn to: The Water Regulations guide published by the Water Regulations Advisory Service (WRAS) gives full details of the requirements.

In IE, the requirements given in the current edition of I.S.813 "Domestic Gas Installations" and the current Building Regulations must be followed.

Boiler Design

Boiler Design

This boiler is designed as a high efficiency central heating appliance, close coupled to an un-vented cylinder. The pumps, expansion vessels and associated safety devices are all fitted within the appliance, providing a one box solution for properties requiring a high domestic hot water demand. The intelligent control system is designed for both simple operation and maximum control. Once the controls are set the boiler will operate automatically.
Additionally a thermostatically controlled immersion heater with manual reset is fitted to the cylinder as a back up for domestic hot water in the event of the boiler being inoperable. It is intended for use as a back up should the boiler fail, it will not give optimum DHW performance.

Pluming from flue terminal

Like all condensing boilers this appliance will produce a plume of condensation from the flue terminal in cool weather. This is due to the high efficiency and hence low flue gas temperature of the boiler. This is normal and not an indication of a fault.

Condensate Drain

A plastic drain pipe must be fitted to allow discharge of condensate to a drain.

Condensate should, if possible, be discharged into the internal household draining system. If this is not practical, discharge can be made externally into the household drainage system or a purpose designed soak away, see section 6 for more details.

Safety Devices

Electrical Supply Failure

The boiler will not work without an electrical supply.

Normal operation of the boiler should resume when the electrical supply is restored.

Reset any external controls, to resume normal operation of the central heating.

If the boiler does not resume normal operation press the reset button. If the boiler does not resume normal operation after this, refer to fault finding.

Overheating Safety

In the event of the boiler overheating the safety devices will cause a safety shutdown. A “Reset” may be required if a fault code (‘F’ followed by a number) appears on the digital display, refer to ‘F’ codes, section 14 Fault Finding. A manual reset button is also provided on the thermostat in the immersion heater.

Safety Discharge Valves

Three safety discharge valves and discharge pipes are fitted to the boiler, two PRV’s and one pressure/temperature relief valve. The valves **must not** be touched.

Should there be any discharge from the pipes, isolate the boiler electrical supply and call your installer or Glow-worm’s own service organisation using the telephone number on the inside front cover of this booklet.

Frost protection

The appliance has a built in frost protection device that protects the boiler from freezing. With the gas and electric supplies ON and irrespective of any room thermostat setting, the frost protection device will operate the pump when the temperature of the boiler water falls below 8^{O}C.

After 10 minutes the pump will be stopped if the temperature is higher than 10^{O}C or has already reached 35^{O}C.

The burner will activate if the boiler temperature does not reach 10^{O}C after 30 minutes or at any time if the temperature drops to 5^{O}C.

The burner will switch off when the temperature reaches 35^{O}C.

Frost protection is also built into the cylinder.
Should the cylinder temperature fall below 10^{O}C, the tank is re-heated to a temperature of 15^{O}C.

The cylinder has a built in disinfection cycle which raises the water temperature to 70^{O}C for 1 hour every Wednesday at 2:00am.

Condensate Drain Blockage

As a safety feature the boiler will stop working if the condensate drain becomes blocked. During freezing conditions this may be due to the forming of ice in the condense drain external to the house. Release an ice blockage by the use of warm cloths on the pipe, the boiler should then restart.

Servicing, Maintenance and Spare Parts

Servicing and Maintenance

To ensure the continued efficient and safe operation of this boiler, it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage.
If this boiler is installed in a rented property there is a duty of care imposed on the owner of the property by the current issue of the Gas Safety (Installation and Use) Regulations, Section 35.
Servicing/maintenance should be carried out by a **competent person** approved at the time by the Health and Safety Executive in accordance with the rules in force in the countries of destination.
After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of these instructions.

Spare Parts

Remember, when replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Glow-worm.
If a part is required contact Glow-worm’s own service organisation.
Please quote the name and model of the boiler.
The name badge is on the front of the appliance and the model type is positioned on the top edge of the tank module front panel.
If in doubt seek advice from the local gas company or Glow-worm’s own service organisation using the telephone number on the inside front cover of this booklet.

1 Boiler Specifications

Data

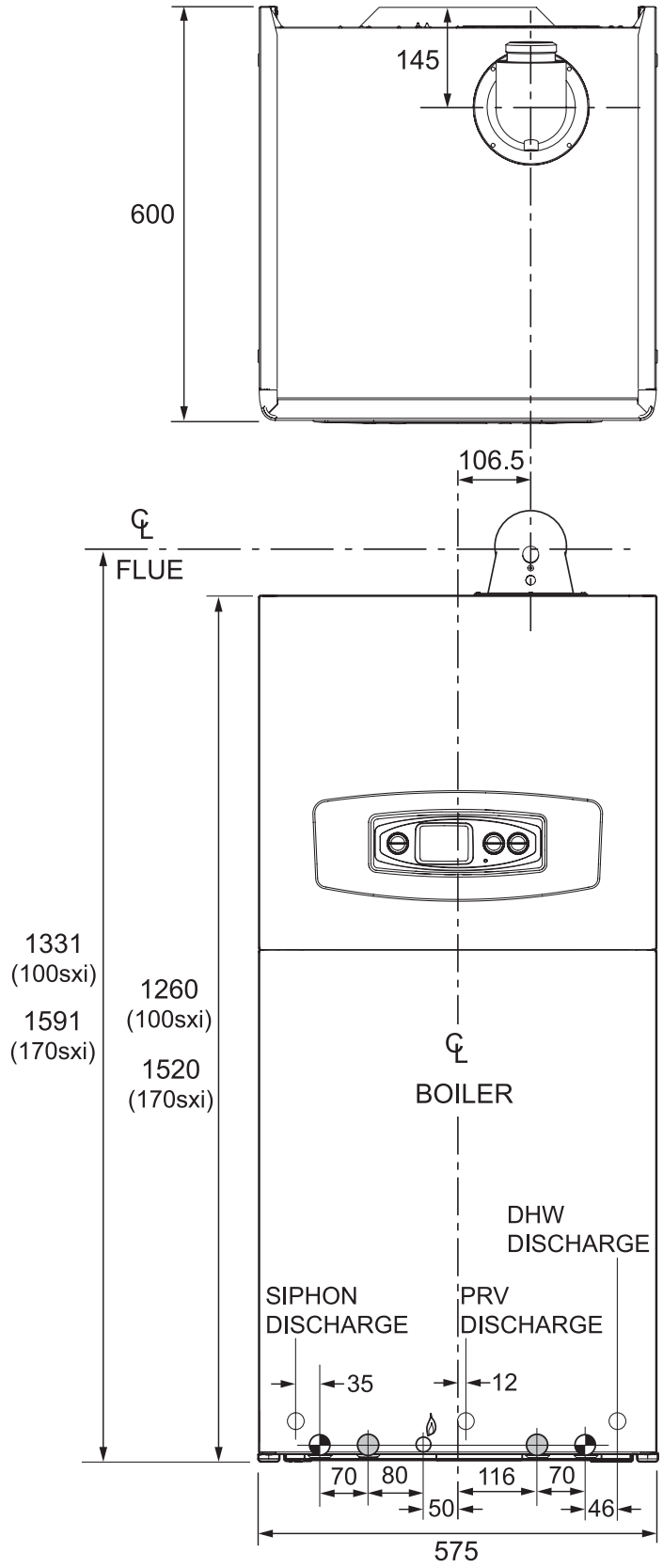
All dimensions are given in millimetres (except as noted).

See diagram 1.1 and the Boiler Specification Table below.

The data label is positioned inside the boiler module on the base.

13340

BOILER SPECIFICATION	100sxi	170sxi
Lift weight - Tank Module	39kg (86lb)	48kg (106lb)
- Boiler Module	50.5kg (111lb)	50.5kg (111lb)
Total weight (installed inclusive water)	175kg (385lb)	225kg (495lb)
Gas connection Ø O.D.	22mm. copper (15mm on jig)	22mm. copper (15mm on jig)
Heating flow and return connection Ø O.D.	22mm. copper	22mm. copper
Domestic hot water connection Ø O.D.	22mm. copper	22mm. copper
Condensate connection Ø I.D.	21.5mm. plastic	21.5mm. plastic
Safety valve discharge connection Ø O.D.	22mm. copper	22mm. copper
CH safety discharge valve (preset)	3 bar (43/5lbf/in^2)	3 bar (43/5lbf/in^2)
Heating system minimum pressure	0.7bar (10.1lbf/in^2)	0.7bar (10.1lbf/in^2)
CH flow temperature	82°C Max / 28°C Min	82°C Max / 28°C Min
DHW flow temperature	62°C	62°C
DHW Specific flow rate at 35°C rise	24.0 l/min	25.0 l/min
DHW recovery from 15°C to 65°C	10 mins	17 mins
DHW recovery from 70% draw off	9 mins	12 mins
CH Expansion vessel capacity	10 litres (2.2 gallons)	10 litres (2.2 gallons)
CH Expansion vessel charge pressure	0.75bar (11lbf/in^2)	0.75bar (11lbf/in^2)
DHW Expansion vessel capacity	12 litres	12 litres
DHW Expansion vessel capacity pre charge	3 bar (44lbf/in^2)	3 bar (44lbf/in^2)
Pressure reducing valve (preset)	3.5 bar (51.5lbf/in^2)	3.5 bar (51.5lbf/in^2)
Pressure and temp safety discharge valve	90°C and 7 bar	90°C and 7 bar
Safety discharge valve	6 bar (88lbf/in^2)	6 bar (88lbf/in^2)
Electrical supply	230V~50Hz fused at 3A	230V~50Hz fused at 3A
Electrical rating	210W fused 3A	210W fused 3A
IP clasification	IPX4D	IPX4D
Internal fuse rating on main PCB	2A	2A
Gas supply	G20 natural gas G31 LPG	G20 natural gas G31 LPG
Gas category	II_{2H3P}	II_{2H3P}
Inlet gas working pressure	20mbar	20mbar
Burner % CO_2 case on (after 5 mins)	9.2 ± 0.5	9.2 ± 0.5
Burner % CO_2 case off (after 5 mins)	9.0 ± 0.5	9.0 ± 0.5
Approximate max. gas rate after 10 mins. from cold	3.30 m^3/hr 116.5 ft^3/hr	3.30 m^3/hr 116.5 ft^3/hr
DHW - Heat input NETT Q = kW	31.6 max. 8.9 min.	31.6 max. 8.9 min.
DHW - Heat output NETT Q = kW	31.0 max. 8.7 min.	31.0 max. 8.7 min.
CH - Heat input	24.5kW	24.5kW
CH - Heat output - non condensing	24.33kW	24.33kW
CH - Heat output - condensing	25.5kW	25.5kW
Flue type	C_{13}, C_{33}	C_{13}, C_{33}
SEDBUK rating % 2005	91.5	91.5
SEDBUK rating % 2009	89.2	89.3
NOx	Class 5	Class 5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145
600
106.5
FLUE
1331
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1591
(170sxi)
1260
(100sxi)
1520
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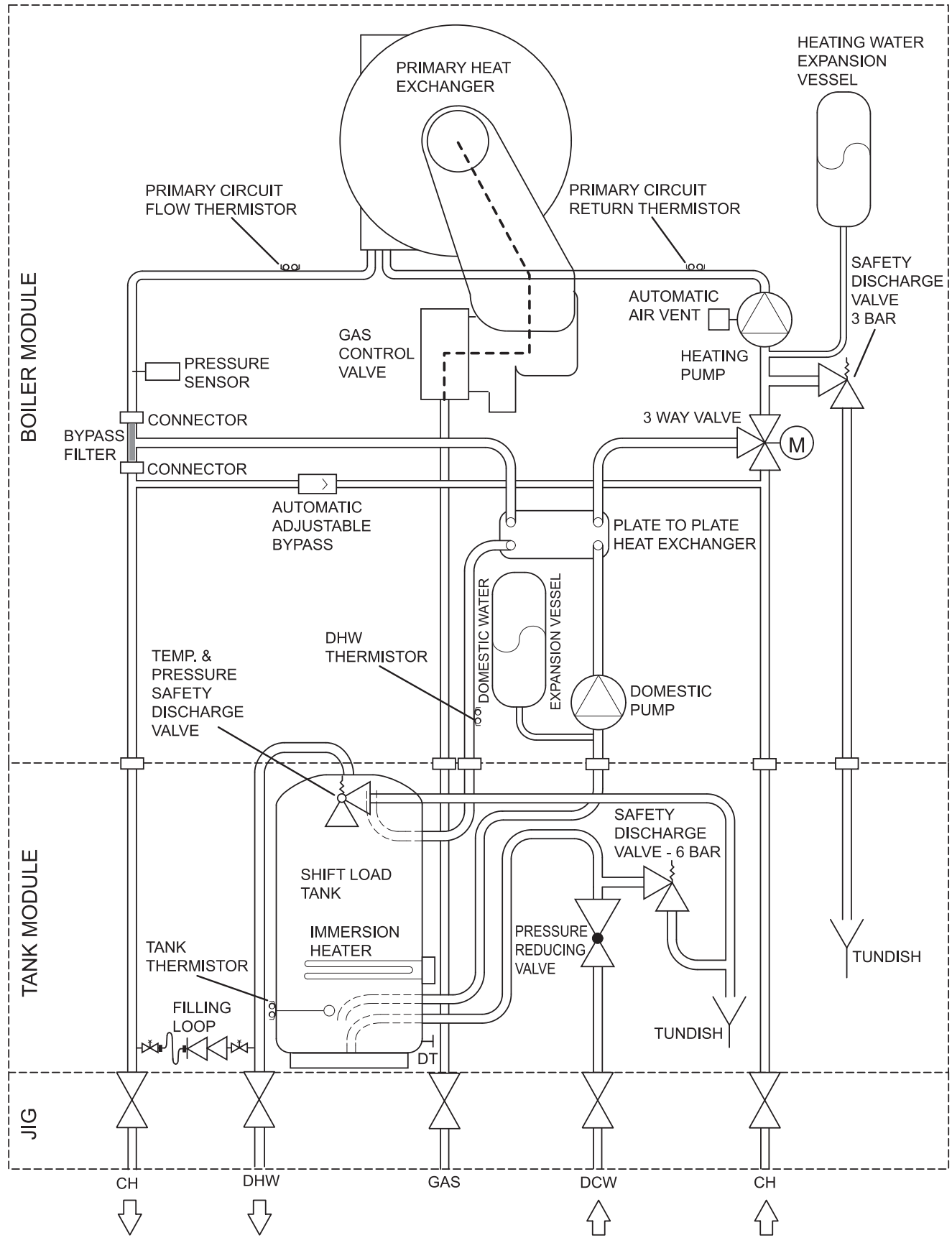
BOILER
DHW
DISCHARGE
SIPHON
DISCHARGE
PRV
DISCHARGE
35
12
70
80
116
70
50
46
575
CENTRAL HEATING
DOMESTIC WATER
GAS CONNECTION

Diagram 1.1



HYDRAULIC SCHEMATIC

Diagram 1.2

2 Boiler Location, Clearances and Ventilation

2.1 Location

This boiler is not suitable for outdoor installation.

This boiler may be installed in any room, although particular attention is drawn to the installation of a boiler in a room containing a bath or shower where reference must be made to the relevant requirements.

This boiler is suitable for installation in bathroom zones 2 and 3.

In GB this is the current I.E.E. WIRING REGULATIONS and BUILDING REGULATIONS.

In IE reference should be made to the current edition of I.S.813 “Domestic Gas Installations” and the current ETCI rules.

2.2 Clearances

The boiler should be positioned so that at least the minimum operational and servicing clearances are provided, see diagram 2.1.

Additional clearances may be beneficial around the boiler for installation and servicing.

For flue installations where external access is not practicable, consideration should be given for the space required to insert the flue internally, which may necessitate a clearance larger than those specified in diagram 2.1.

2.3 Timber Frame Buildings

If the boiler is to be installed in a timber frame building it should be fitted in accordance with the Institute of Gas Engineers document IGE/UP/7/1998. If in doubt seek advice from local gas undertaking or Glow-worm.

2.4 Room Ventilation

The boiler is room sealed so a permanent air vent is not required.

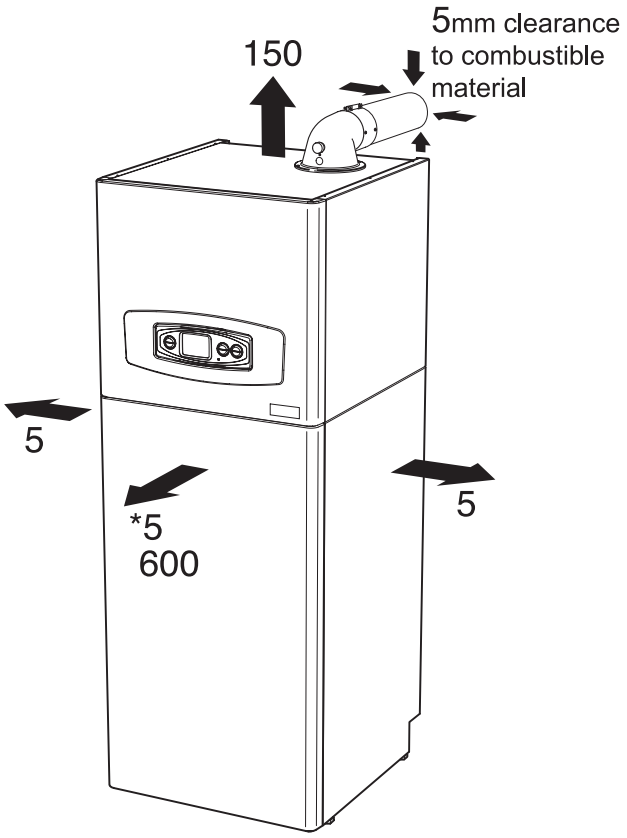
2.5 Cupboard or Compartment Ventilation

Due to the high efficiency and hence low casing temperature of this boiler, cupboard or compartment ventilation is not necessary.

Leave existing air vents.

13241

CLEARANCES
(from casing panels)



*A removable compartment door can be placed a minimum 5mm in front of the appliance. A clearance of 600mm is required from a fixed surface.

Diagram 2.1

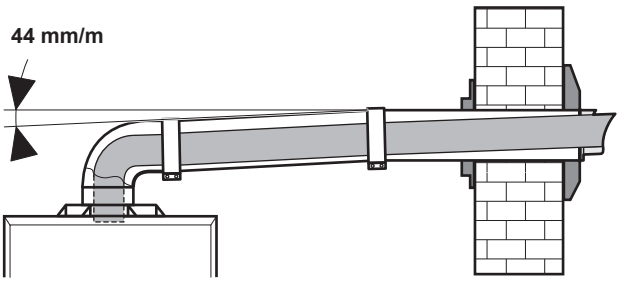
3 Evacuation of Combustion Gas

3.1 Regulation

Only flue accessories supplied by Glow-worm must be used.

Different flue outlet configurations can be carried out.

- Consult your supplier for more information about the other possibilities and associated accessories.



- Standard flue terminal kits have an in-built fall back to the boiler to drain the condensate. These can be fitted level between the appliance and the termination position. All other extended flues must have a fall of at least 44mm/m

The maximum length of the flue outlet is defined according to its type (for example C13).

- Whatever the kind of flue system chosen, observe the minimum distances indicated in the chart below to position the flue terminals.
- To install the flue, refer to the separate flue instruction supplied with your appliance.
- Explain these requirements to the user of the appliance.

If necessary, you must install terminal protection.

Caution! The connection between the flue elbow and the flue outlet must be sealed.

In GB the minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram overleaf.

In IE the minimum distances for flue terminal positioning must be those detailed in I.S.813 “Domestic Gas Installations”.

The terminal must be exposed to the external air, allowing free passage of air across it at all times.

Being a condensing boiler some pluming may occur from the flue outlet. This should be taken into consideration when selecting the position for the terminal.

Carports or similar extensions of a roof only, or a roof and one wall, require special consideration with respect to any openings, doors, vents or windows under the roof. Care is required to protect the roof if made of plastic sheeting. If the carport comprises of a roof and two or more walls, seek advice from the local gas supply company before installing the boiler.

If the flue terminal is positioned near a light source insects may enter the flue system. Where safe and practical to do so advise the homeowner to check the flue outlet and clear visible insects from the terminal end.

H* and J* See diagram 3.2. These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions.
NOTE: If the flue terminal is positioned near a light source insects may enter the flue system. Where safe and practical to do so, advise the homeowner to check the flue outlet and clear visible insects from the terminal end.

Terminal Guard

A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage. If a terminal guard is required, it must be positioned to provide minimum of 50mm clearance from any part of the terminal and be central over the terminal.
The guard should be similar to that shown in diagram 3.1.
A suitable guard is manufactured by: -
Tower Flue Components
Morley Rd.
Tonbridge
Kent TN9 1RA.
Size: 280mm x 165mm. Part No: CGDK3

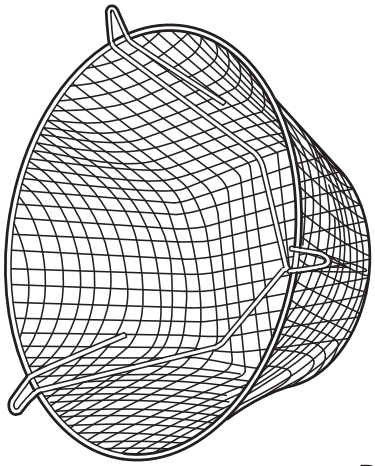
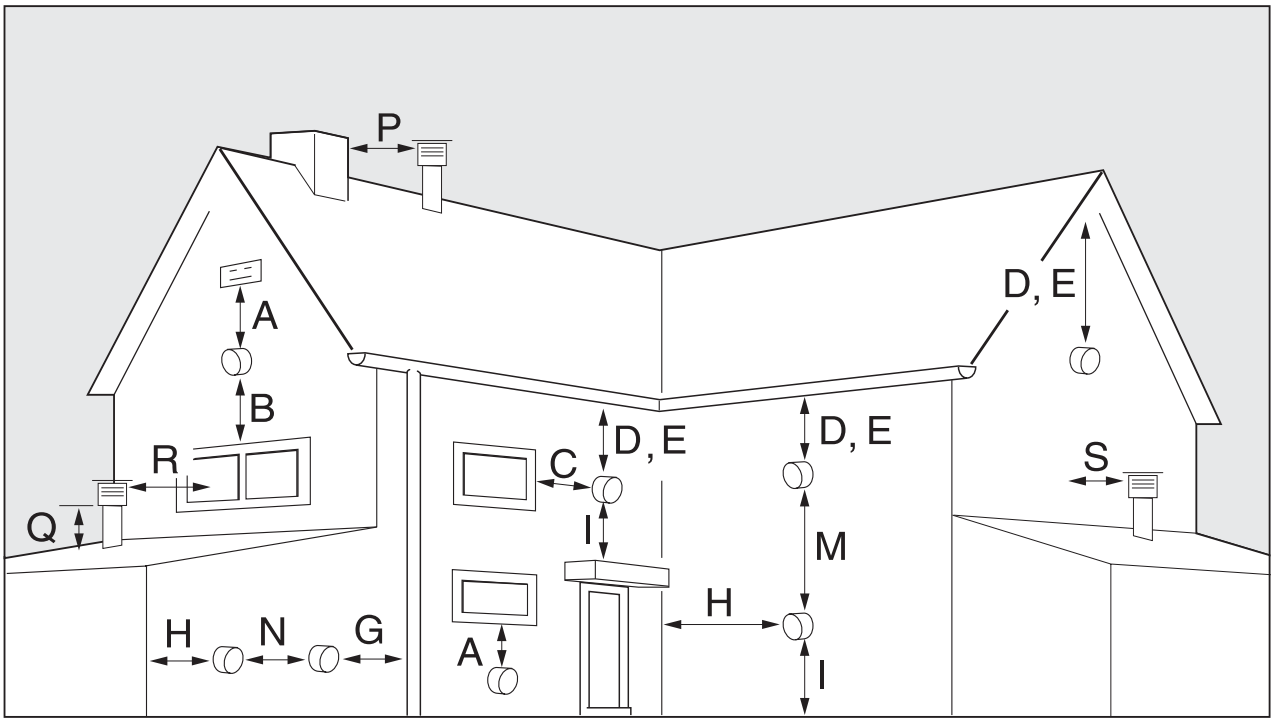


Diagram 3.1

3 Evacuation of Combustion Gas



UNDER CAR PORT etc.

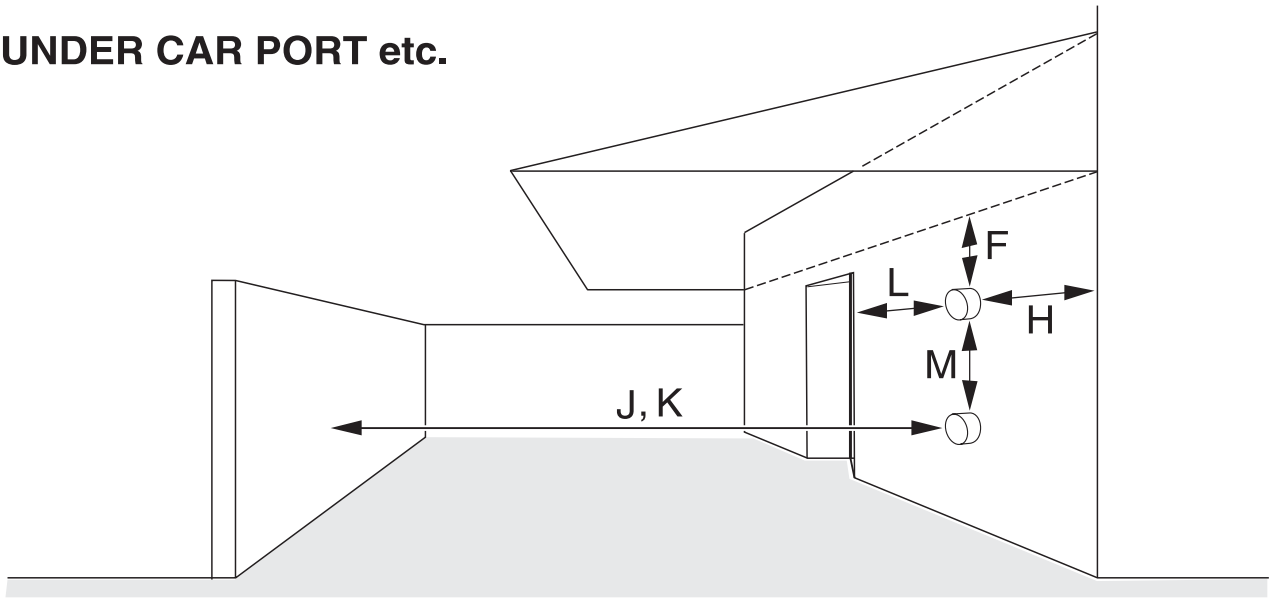


Diagram 3.2

Position	Position of the flue terminal	mm
Horizontal flues		
A	directly below an opening, air brick, opening windows	300
B	above an opening, air brick, opening windows	300
C	horizontally to an opening, air brick, opening windows	300
D	below gutter, drain/soil pipe	25
E	below eaves	25
F	below a balcony or car port	25
G	from vertical drain pipes and soil pipes	25
H	from internal/external corners	25
H*	to a boundary alongside the terminal	300
I	above adjacent ground or balcony level	300
J*	from surface or a boundary facing the terminal	600

Position	Position of the flue terminal	mm
L	from opening (door/window) in car port into dwelling	1200
M	vertical from a terminal	1500
N	horizontally from a terminal	300
Vertical flues		
P	from another terminal	600
Q	above roof level	300
R	from adjacent opening window	1000
S	from adjacent wall to flue	300

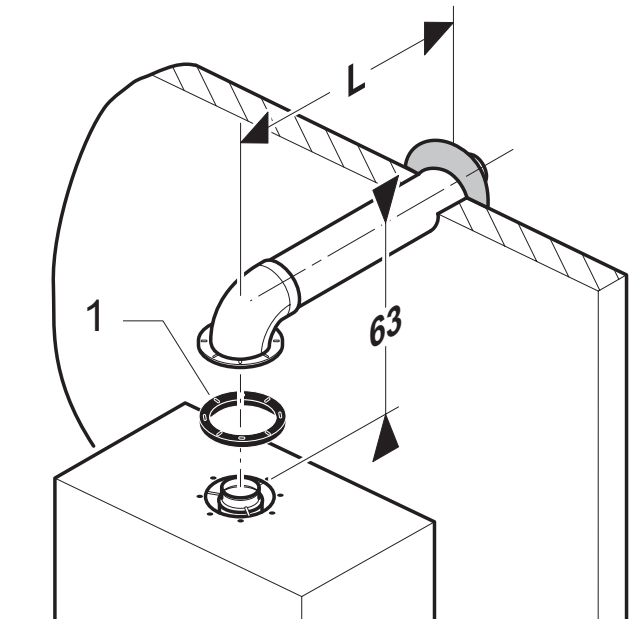
(*) These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions.

3.2 Flue configuration description

3.2.1 Horizontal concentric flue Ø 60/100 mm or Ø 80/125 mm (C13 type installation)

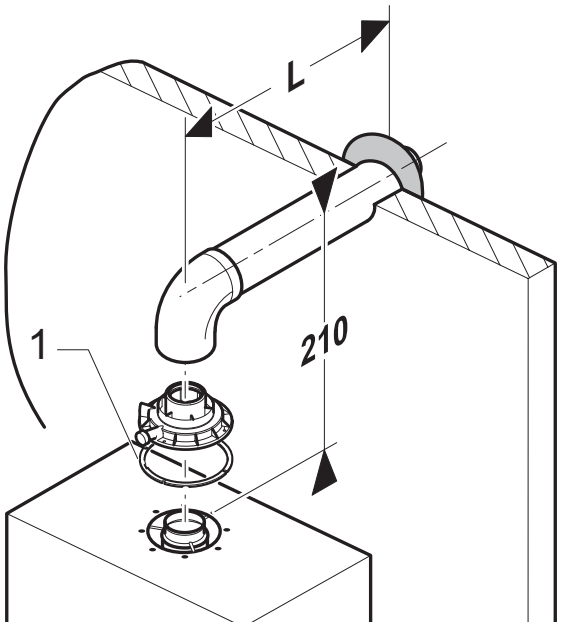
If the terminal is at less than 1.80 m from the ground, you must install a terminal protection kit.

Ø 60/100 mm



Key
1 Gasket (fitted)

Ø 80/125 mm



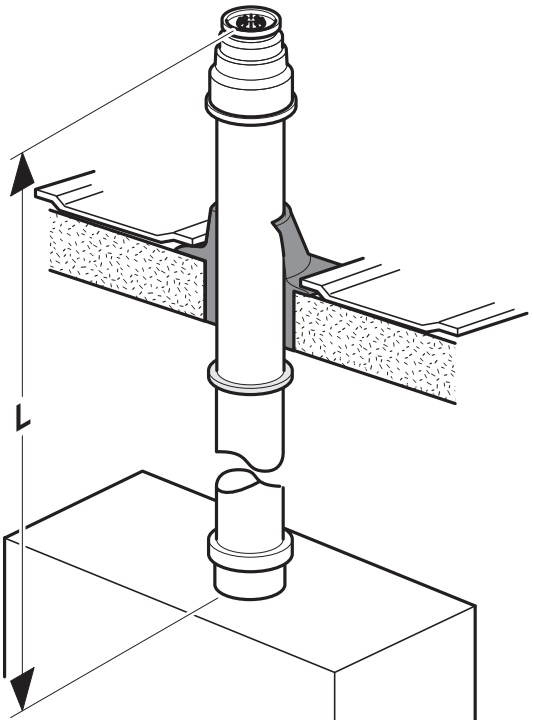
Key
1 Gasket (fitted)

Type	Max length
Ø 60/100	8 m
Ø 80/125	25 m

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

3.2.2 Vertical concentric flue Ø 60/100 mm or Ø 80/125 mm (C33 type installation)

If the terminal is at less than 1.80 m from the ground, you must install a terminal protection kit.



Type	Max length (L)
Ø 60/100	12 m
Ø 80/125	25 m

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

4 Heating System

General

The boiler is for use only with sealed central heating systems.

The digital readout on the controls fascia indicates the system pressure when there is no demand.

The circulation pump is integral with the boiler.

4.1 Safety Valves

The safety valves are factory fitted and are an integral part of the boiler and must not be adjusted or used for any other purpose.

NOTE: The pipe from the safety discharge valve must not discharge above an entrance, window or any type of public access area.

4.2 Expansion Vessel

The boiler has an integral expansion vessel with a capacity of 10 litres (2.2 gallons), with a charge pressure of 0.75bar.

NOTE: The expansion vessel volume depends on the total water system volume and the initial system design pressure. Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1, for IE refer to the current edition of I.S.813 “Domestic Gas Installations”.

4.3 Flow Rate

If it is necessary to alter the flow rate, the system can be fitted with a lockable balancing valve in the main flow or return pipes shown as valve “A” in diagram 4.1.

The flow rate through the boiler must not be allowed to fall below that given in section 1 - Specification table.

4.4 Bypass

The boiler is fitted with an automatic adjustable bypass.

Diagram 4.2 shows the pump head remaining for the heating system depending on the bypass setting and the speed setting of the pump, see section 12 Commissioning.

4.5 Filling the Sealed System

NOTE: The water pressure at the boiler must be at least 0.7bar to enable filling the boiler to a minimum pressure through the integral filling device, see diagrams 4.1 and 12.2.

4.6 Water Treatment

In the case of an existing system, it is ESSENTIAL that prior to installing the new boiler the system is thoroughly flushed. For optimum performance after installation of a new system, the boiler and its associated central heating system should also be flushed. Flushing should be carried out in accordance with BS7593: 2006 using a cleanser such as Sentinel X300 or X400, Fernox Restorer or Salamander corrosion guard cleaner.

For long-term corrosion protection, after flushing, an inhibitor suitable for stainless steel exchangers should be used, refer to the current issue of BS 5449 and BS 7593 on the use of inhibitors in central heating systems. Examples are Sentinel X100 Fernox Protector or Salamander corrosion guard inhibitor.

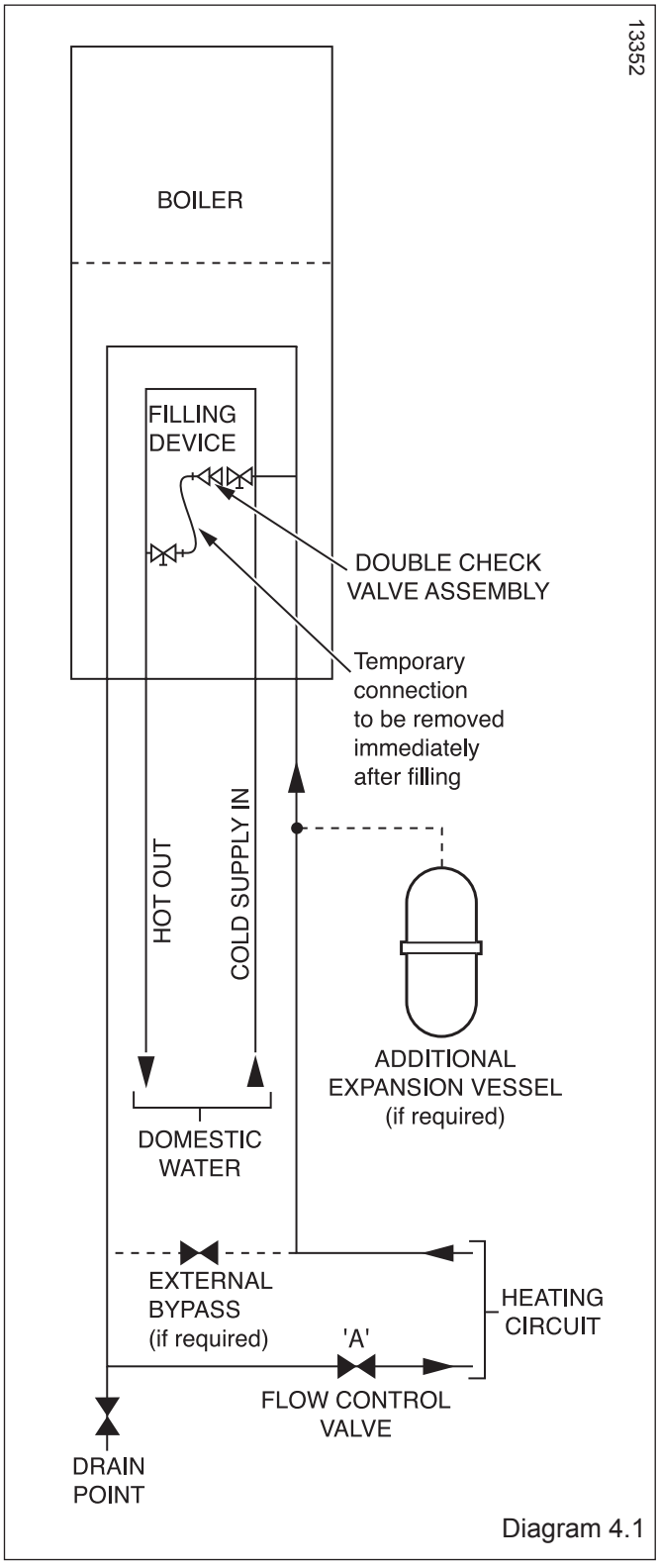


Diagram 4.1

4 Heating System

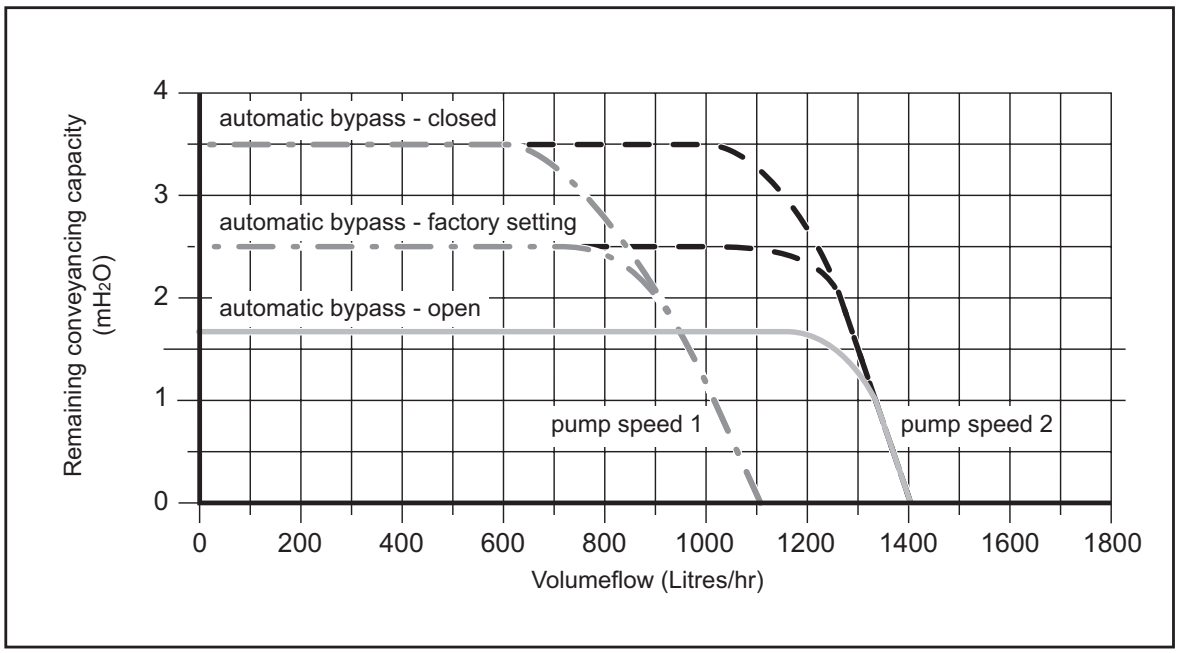


Diagram 4.2

5 Domestic Hot Water

General

All domestic hot water circuits, connections, fittings must be in accordance with the relevant standards and water supply regulations.
The boilers are suitable for connection to most types of domestic appliances.
When connecting to suitable showers, ensure that:

a) The cold water inlet to the boiler is fitted with an approved anti-vacuum or siphon non-return valve.
b) Hot and cold water supplies to the shower are of equal pressure.

5.1 Water Pressure

This boiler will operate satisfactorily at low water inlet pressure, however for optimum performance it is recommended that 22mm feed pipe is used with an inlet pressure, at the appliance, of 2 bar.
NOTE: Higher pressure can be tolerated as the boiler is fitted with a pressure reducing valve set at 3.5 bar.

5.2 Expansion Vessel

The boiler has an integral expansion vessel with a capacity of 12 litres (2.6 gallons), with a charge pressure of 3 bar.

NOTE: The expansion vessel volume depends on the total water system volume and the initial system design pressure. Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1, for IE refer to the current edition of I.S.813 “Domestic Gas Installations”.

5.3 Draining Point

A draining point is provided at the bottom of the hot water storage tank located next to the condensate drain, see diagram 5.1.

5.4 Safety Valves

The safety valves are factory fitted and are an integral part of this boiler and they must not be adjusted or used for any other purpose.

NOTE: The pipe from the safety discharge valve must not discharge above an entrance, window or any type of public access area.

5.5 ‘Hard’ Water Areas

The temperatures within the heat exchanger are limited by the boiler control system to minimise scale formation within the hot water pipework. However, in areas where the water is ‘hard’ (i.e. more than 200mg/litre), it is recommended that the hot water setting is reduced and that a scale reducer is fitted, refer to the manufacturer’s instructions or consult the local water company for additional advice.

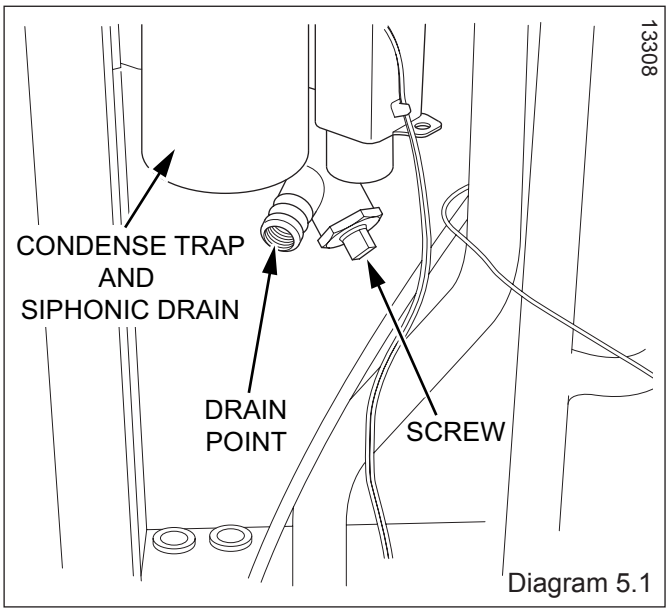


Diagram 5.1

5.6 SYSTEM REQUIREMENTS – Domestic Hot Water

Domestic Hot Water Requirements

General - All domestic hot water circuits, connections, fittings must be in accordance with the relevant standards and water supply regulations.
For GB: Guidance G17 to G24 and recommendation R17 to R24 of the Water Regulations Guide (for Scotland, the Water Byelaws 2000, Scotland).
Document G Sanitation, hot water safety and water efficiency, section 3 of the building regulations, requires that the installation of an unvented system should be notified to the local authority Building Controls Department and that the work must be carried out by a competent person approved at the time by the Health and Safety Executive, as defined in the approved document G3.
For IE: The current edition of I.S.813 “Domestic Gas Installations”.
Where a storage system will not have a vent to atmosphere the installation must comply with the building regulations and the Water Supply (water fittings) regulations 1999 and water byelaws 2000, Scotland, see also the current issue of BS5546 and BS6700.
If fitting to an existing system the local authority should be informed.
NOTE:
Bye-laws of the appropriate Water Undertake also apply.

Discharge Pipework
It is a requirement of Building Regulation G3 that any discharge from an unvented system is conveyed to where it is visible but will not cause danger to persons in or about the building. The tundish and discharge pipes should be fitted in accordance with requirements and guidance notes of Building Regulation G3.

NOTE: The tundishes are factory fitted during manufacture. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, preferably be of metal and:
a) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of straight pipe 9m long i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger and so on. Bends must be taken into account in calculating the flow resistance.
An alternative approach for sizing discharger pipes would be to follow BS67100:1987 specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. Appendix E section E2 and table 21.
b) Have a vertical section of at least 300mm long, below the tundish before any elbows or bends in the pipework.
c) Be installed with a continuous fall.
d) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:
i) Ideally below a fixed grating and above the water seal in a trapped gully.
ii) Downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact whilst maintaining visibility.
iil) Discharges at high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges (tundish visible).
iv) Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

5 Domestic Hot Water

NOTE: The discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rain water goods may be damaged by such discharges.

Worked example of discharge pipe sizing

The example given in diagram 5.2 is for a G1/2 temperature relief valve with a discharge pipe (D2) having 4 No. 22mm elbows and length of 7m from the tundish to the point of discharge.

From Table 1:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve is 9.0m.

Subtract the resistance for 4 No. 22mm elbows at 0.8m each = 3.2m.

Therefore the permitted length equates to 5.8m.

5.8m is less than the actual length of 7m therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28mm pipe (D2 from a G1/2 temperature relief valves equates to 18m. Subtract the resistance of 4 No. 28mm elbows at 1.0m each: 4.0m.

Therefore the maximum permitted length equates to: 14m. As the actual length is 7m a 28mm min (D2) copper pipe will be satisfactory.

WARNING:

- Under no circumstances should the factory fitted temperature/pressure relief valve be removed other than by authorised personnel. To do so will invalidate any warranty claim.
- Table 1. Sizing of copper discharge pipe (D2).
- Control and safety valves MUST NOT be tampered with.
- The discharge pipe MUST NOT be blocked or used for any other purpose.
- The tundish is factory fitted and MUST NOT be removed.

13449

TABLE 1	
Valve outlet size	G 1/2
Discharge pipe D1	15mm
Discharge pipe D2 from tundish	22mm
Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbow or bends)	up to 9m
Resistance created by each elbow or bend	0.8m

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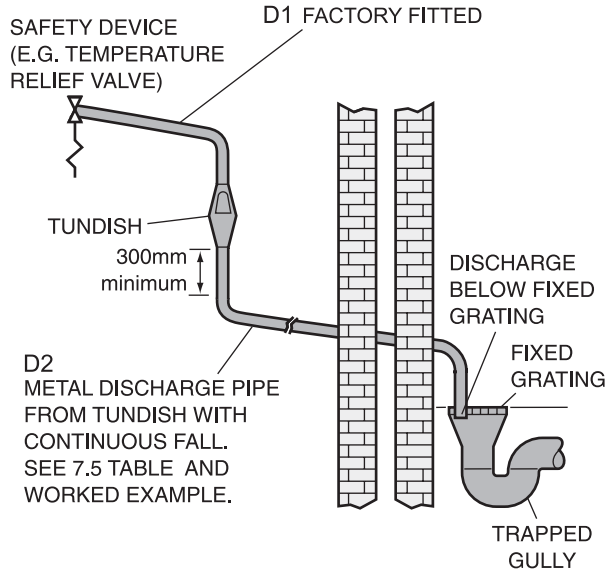

Diagram 5.2

6 Condensate Drain

6.1 Condensate Drain

A plastic drain pipe must be fitted to allow discharge of condensate to a drain.

Condensate should, if possible, be discharged into the internal household draining system. If this is not practical, discharge can be made externally into the household drainage system or a purpose designed soak away, see diagram 6.1 for more details.

6.2 Condensate Connection

A flexible condensate connection pipe is supplied and should be used to connect to a drain outlet pipe 22mm to 25mm OD. non corrosive plastic. The drain outlet pipe should have a fall of at least 2.5^0 away from the boiler.

It is recommended that any external condensate drain pipe is insulated and also preferably of 32mm diameter, to prevent freezing in adverse weather conditions.

The condensate is discharged periodically in ‘slugs’ by siphonic action.

It is not necessary to provide air breaks or extra traps in the discharge pipe as there is already a trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly.

6 Condensate Drain

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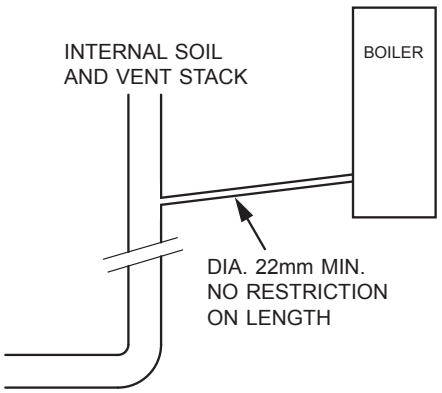
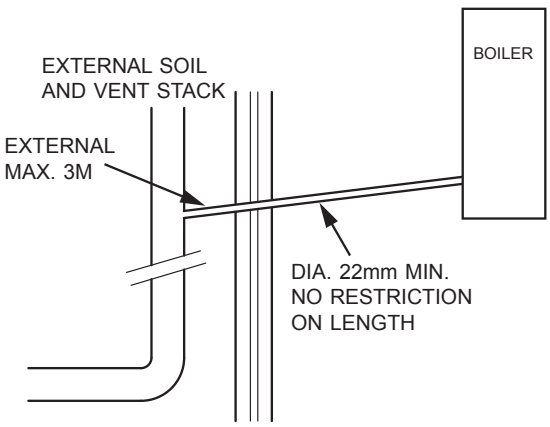
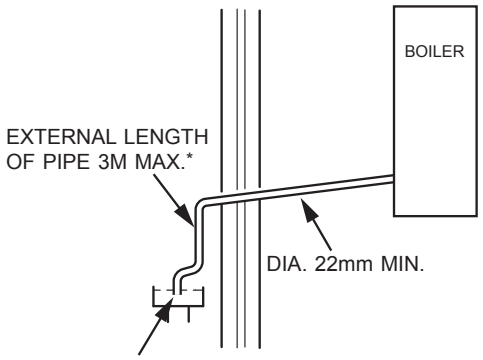


Internal Soil and Vent Pipe

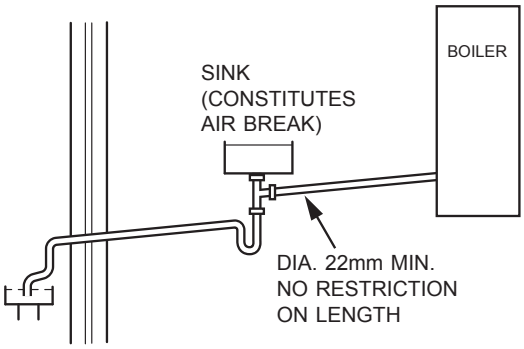


External Soil and Vent Pipe

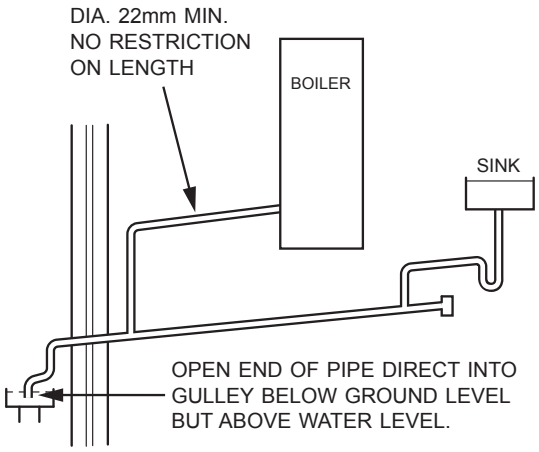


*NOTE: FOR EXTENDED PIPE RUNS 32mm DIA. PIPE SHOULD BE USED.

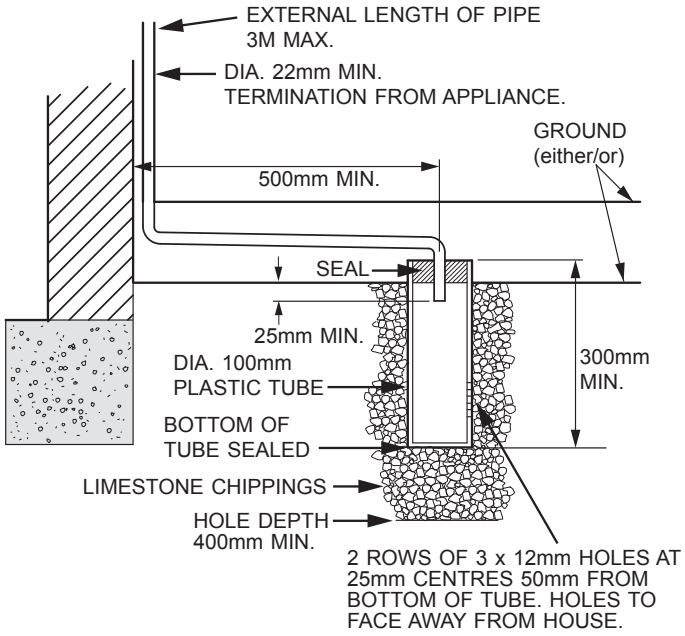
External Termination to a Gulley or Hopper



Internal Termination into Combined Sink Waste



Internal Termination Downstream of Sink Waste



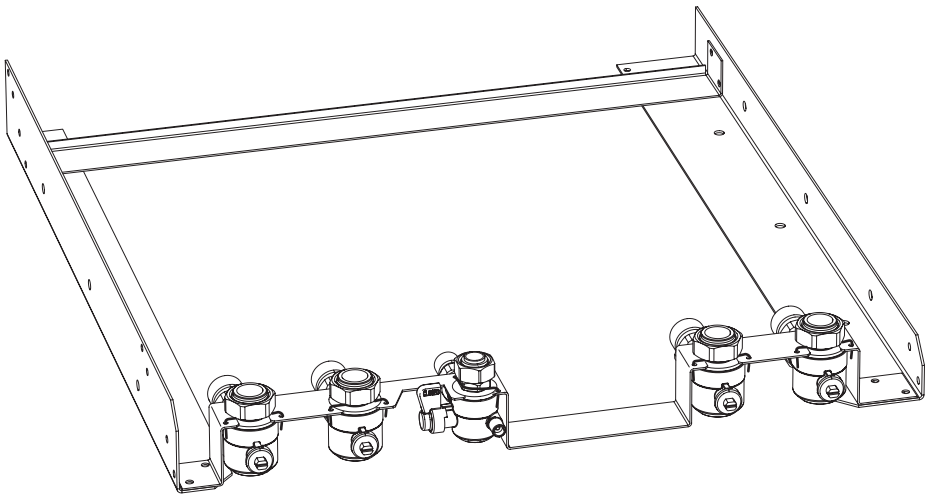
External Termination into Soakaway

NOTE: PIPEWORK SHOULD ALWAYS FALL AWAY FROM BOILER BY AT LEAST 2.5° 44mm FOR EVERY 1M.

Diagram 6.1

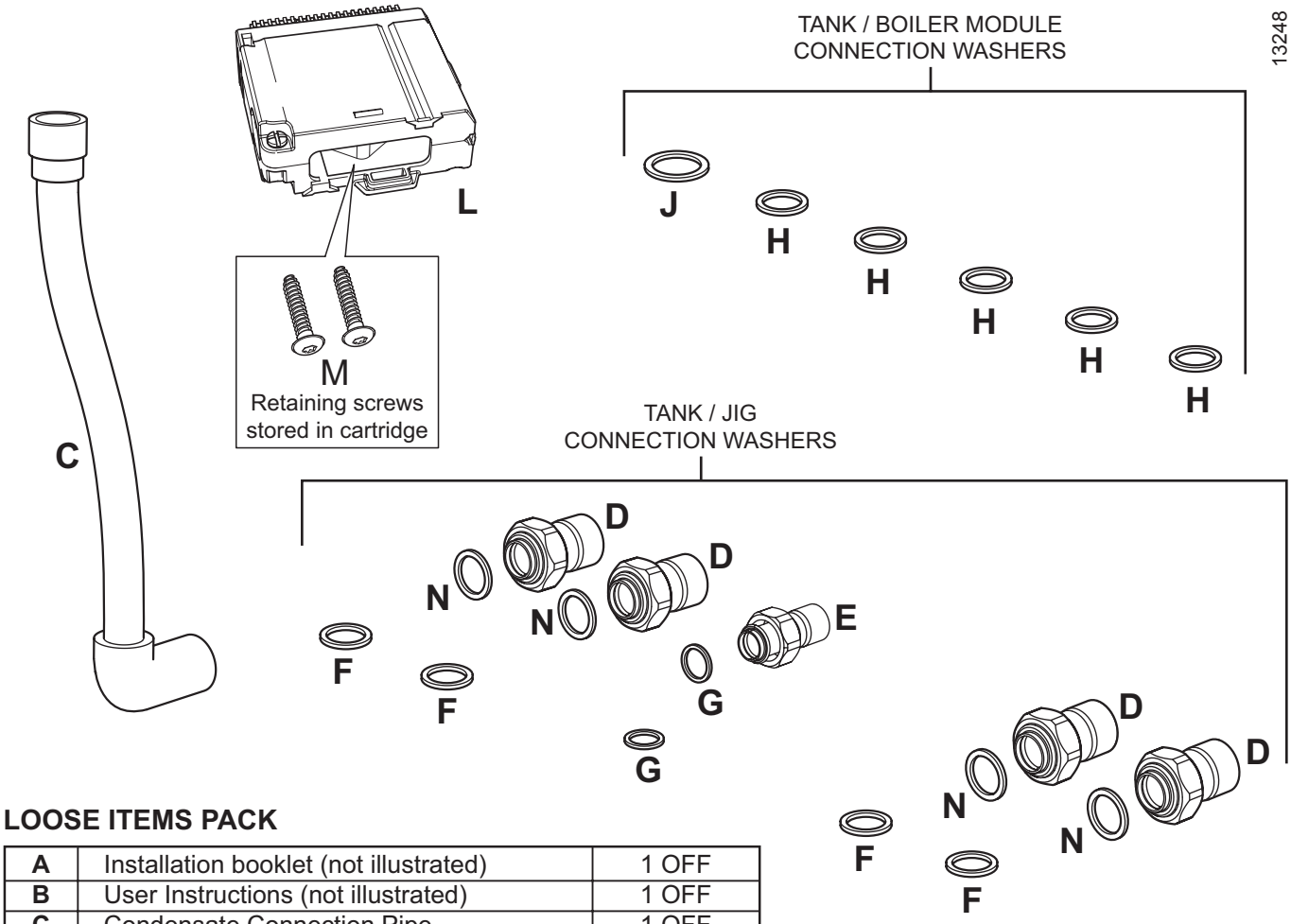
7 Installation Preparation

13405



PLUMBING JIG

13248



LOOSE ITEMS PACK

A	Installation booklet (not illustrated)	1 OFF
B	User Instructions (not illustrated)	1 OFF
C	Condensate Connection Pipe	1 OFF
D	22mm Copper Tails	4 OFF
E	15mm Copper Tail	1 OFF
F	3/4" Sealing Washer (white plastic)	4 OFF
G	1/2" Sealing Washer	2 OFF
H	3/4" Sealing Washer (beige)	5 OFF
J	Pump Washer	1 OFF
K	Floor Template	1 OFF
L	Electrical Cartridge	1 OFF
M	Cartridge Screws (stored in cartridge)	2 OFF
N	3/4" Sealing Washer (blue)	4 OFF

Diagram 7.1

7 Installation Preparation

7.1 Loose Items Pack

Please check the contents of loose items pack as shown in diagram 7.1.

The plumbing jig is located within the tank module polystyrene top pack.

7.2 Site Requirements

The appliance should be sited on a level floor, however slight adjustment can be made using the adjustable feet at the base of the tank module.

The floor strength should be suitable for the combined weight of appliance and water:

100sxi 175kg

170sxi 225kg

NOTE: Due to the varied site conditions we do not supply fixings and advise that the installer should supply those which are suitable.

7.3 Floor Template

Take the floor template from the loose items pack and place in the desired position on the floor, giving due consideration to the required boiler clearances, see diagram 2.1, and the flue you are fitting.

Mark the position of the flue centre, if fitting a side flue, extend the flue centerline into the corner then along the adjacent wall, see diagram 7.2.

For extended side flues, the flue hole centre should be determined by extending the dashed inclined line on the template to the side wall. This dashed line is drawn at 44mm/metre (2.5°) rise from the boiler. Where this line reaches the side wall, a horizontal line should be marked. The vertical centre line of the flue should then be marked on the back wall.

To allow for the flue passing through the wall at this angle a 125mm hole should be drilled irrespective of internal or external installation.

7.4 Flue Hole Cutting

External access flue installation can use a 105mm diameter core drill.

Internal access only flue installation will need a 125mm diameter core drill.

NOTE: The flue is designed with an internal fall of 44mm/metre (2.5°), therefore the hole can be drilled horizontally. If flue extension pipes are to be used then a core drill size of 125mm is required. This will allow the extension pieces to slope at 44mm/metre (2.5°) towards the boiler.

7.5 Plumbing Jig

Align the template with the flue hole then mark the position of the fixing holes for the jig, see diagram 7.3.

Align the location notches on the jig and secure to the floor using suitable screws.

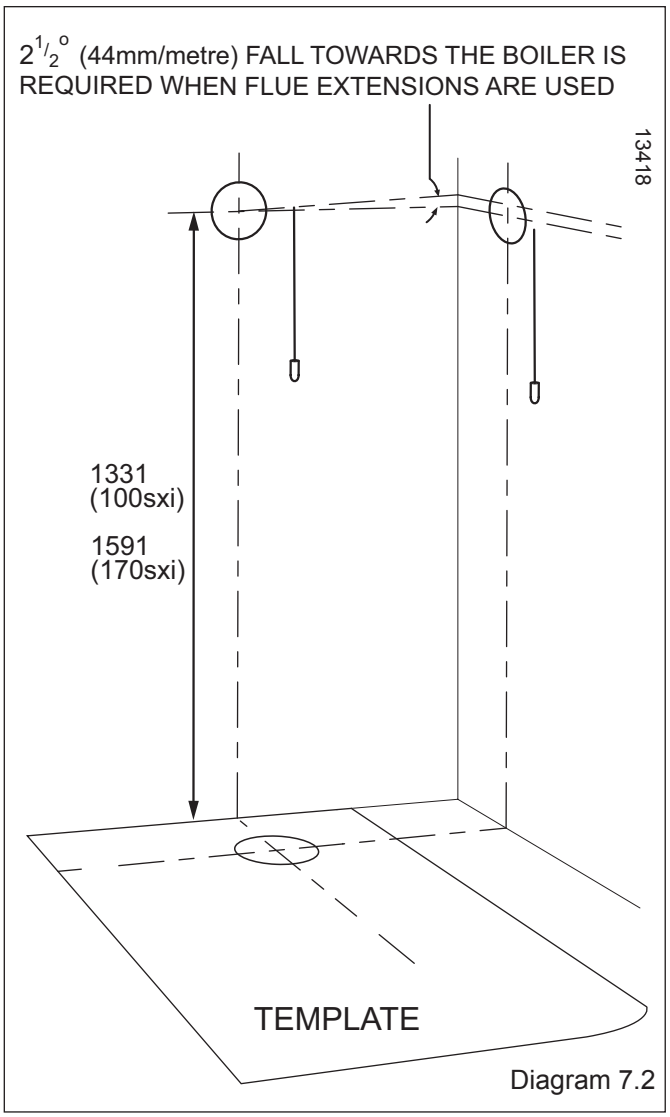


Diagram 7.2

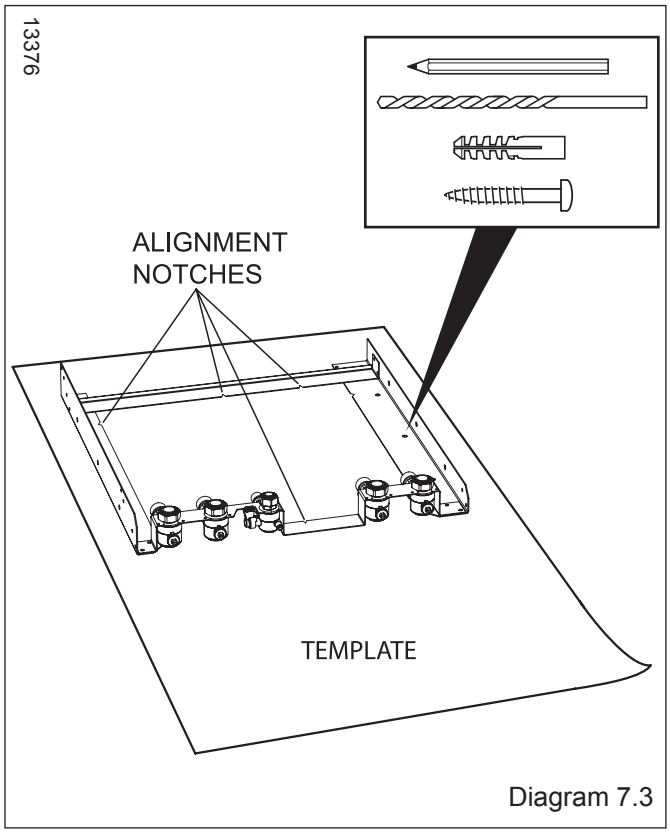


Diagram 7.3

8 Gas, Water & Boiler Connection

8.1 Systems Connection

The water and gas isolation valve connections are on the jig.

The condense drain and safety discharges connections are not on the jig but their pipe runs are shown on the template.

Assemble the copper tails and washers to the jig, secure, then plumb the system as shown in diagram 8.1. taking into account the need to plumb the condense and safety valves also.

NOTE: Do not subject isolation valves to heat.

Slacken the test point screw, see diagram 8.1, connect a manometer.

The whole of the gas installation, including the meter, should be inspected, tested for tightness and purged in accordance with the current issue of BS6891 and in IE the current edition of I.S.813 “Domestic Gas Installations”.

Remove the manometer and secure the test point screw.

On completion of system connections and as an aid to installation, slacken the jig securing screws, this will allow a greater tolerance of site conditions when connecting the isolation valves to the boiler.

IMPORTANT: With regards to the Health and Safety Manual Handling requirements, two persons shall be required to lift the appliance. It should be noted that the appliance is made up of two modules each module requiring two persons to lift.

8.2 Tank Module Connection

IMPORTANT: The electrical cables to the boiler and the immersion heater need to be routed before the installation of the tank module.

Remove the tank module top polystyrene packing, then the carton sleeve.

Pull the tank module front panel forward off the retaining clips.

Slide the tank module into position over the jig and align with the isolation valves.

NOTE: If there is restricted clearance where the boiler is to be located, the tank and boiler modules can be assembled before sliding into position over the jig.

Position the plastic sealing washers as shown in diagram 8.3 and connect the isolation valves. The pipe retaining bracket can be slackened to ease connection.

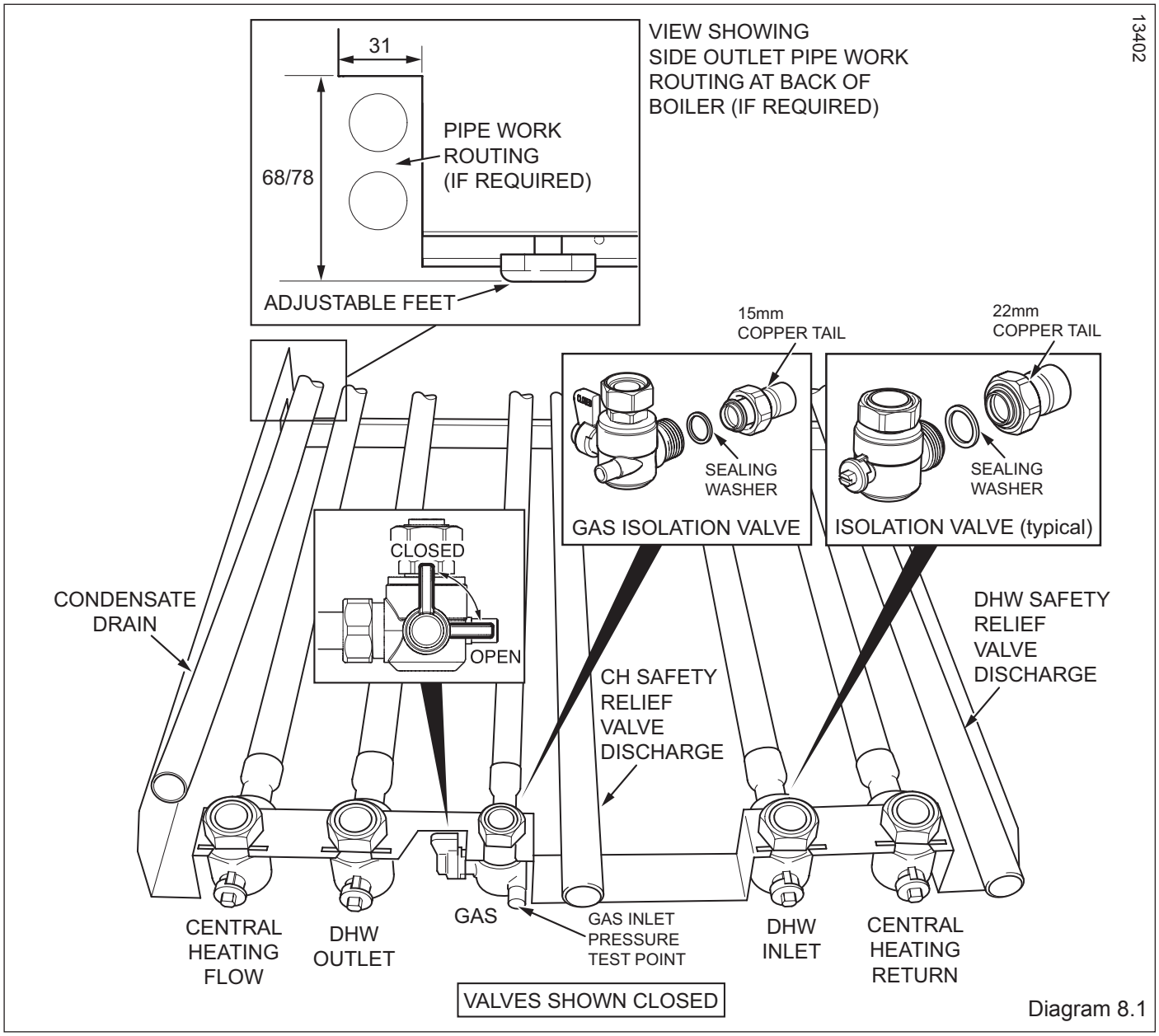


Diagram 8.1

8 Gas, Water & Boiler Connection

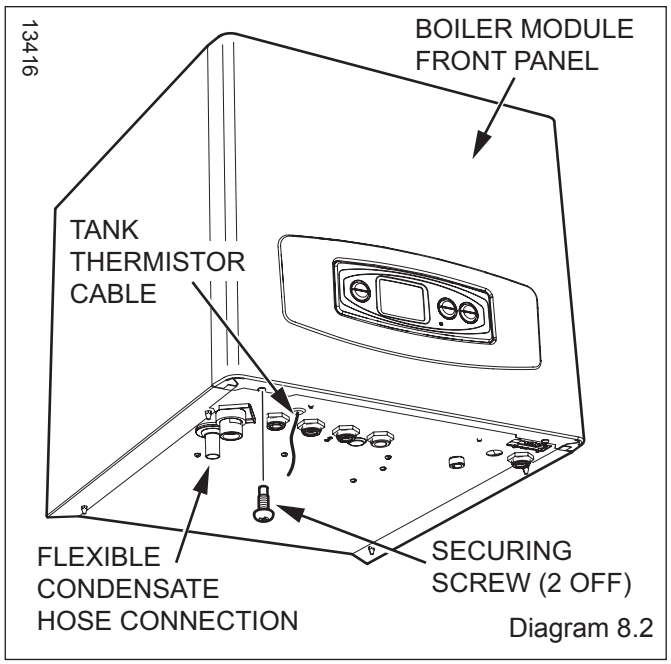


Diagram 8.2

8.3 Boiler Module Connection

Unpack the boiler module from its carton.

Position the boiler on top of the tank ensuring the correct engagement of the locating pins, see diagram 8.3.

Remove the front panel securing screws and lift the panel off at the top locating bracket, see diagram 8.2.

Position the plastic sealing washers as shown in diagram 8.3 and secure to the pipes to the connectors beneath the boiler as shown in diagram 8.2.

On completion secure the pipe retaining bracket if previously slackened and level the boiler using the adjustable feet.

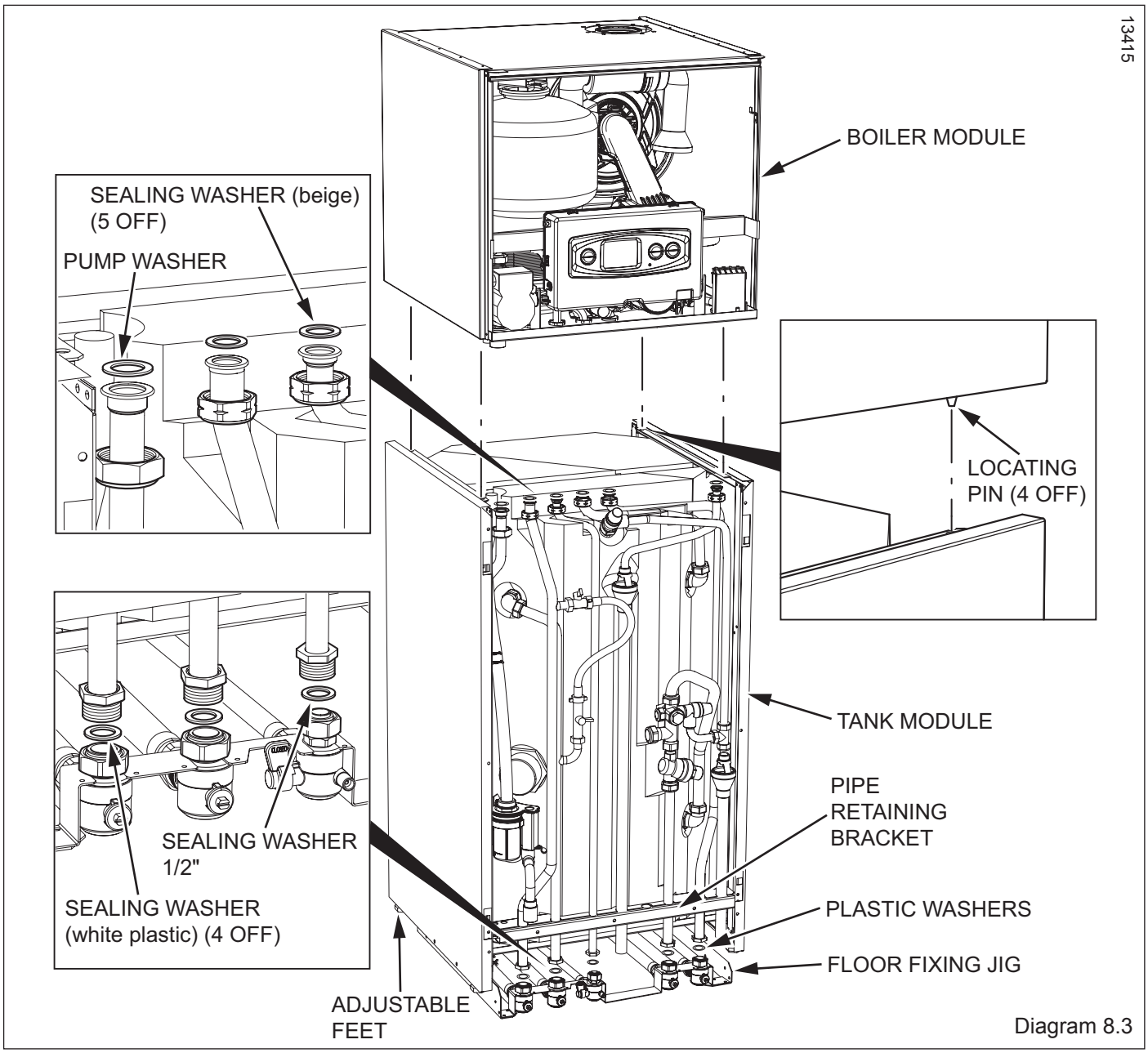


Diagram 8.3

9 Condensate & Safety Discharge Valve Connections

9.1 Safety Discharge Valve

The pipes must be extended, using not less than 22mm o.d. pipe, to discharge, in a visible position, outside the building, facing downwards, preferably over a drain.

The pipe must have a continuous fall and be routed to a position so that any discharge of water, possibly boiling, or steam cannot create any danger to persons, damage to property or external electrical components and wiring.

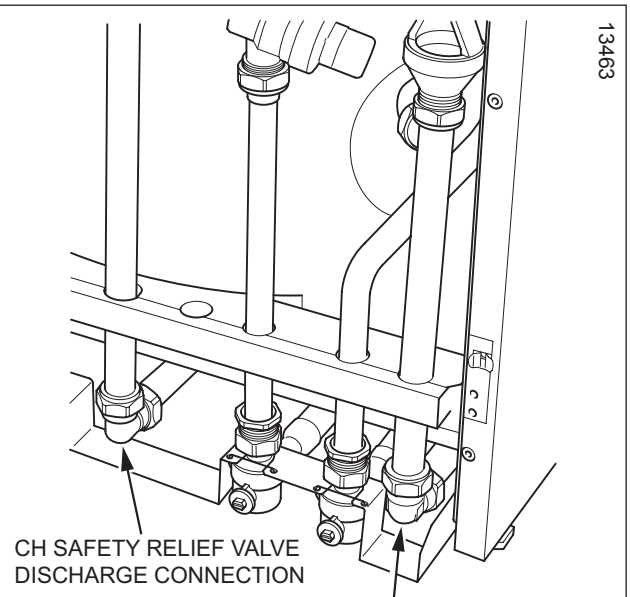
It is advisable to use a 22mm compression elbow to aid in future servicing, see diagram 9.1.

9.2 Condensate Drain Connection

A flexible condensate hose runs from a push-fit connection at the bottom of the heat exchanger and terminates on the boiler module base plate, see diagram 8.2.

Connect the flexible condensate hose to the boiler module, see diagram 9.2.

A flexible condensate connection pipe is supplied in the loose items pack and should be fitted between the condense trap and siphonic drain to the condensate drain pipe, see diagram 9.3, and refer to section 6 to discharge condensate to a drain. The drain pipe 22mm to 25mm OD. non corrosive plastic pipe should have a fall of at least 2.5^0 away from the boiler.


13463
CH SAFETY RELIEF VALVE DISCHARGE CONNECTION
22mm compression (not supplied) is the preferred method of connection for servicing.
DHW SAFETY RELIEF VALVE DISCHARGE CONNECTION
Diagram 9.1

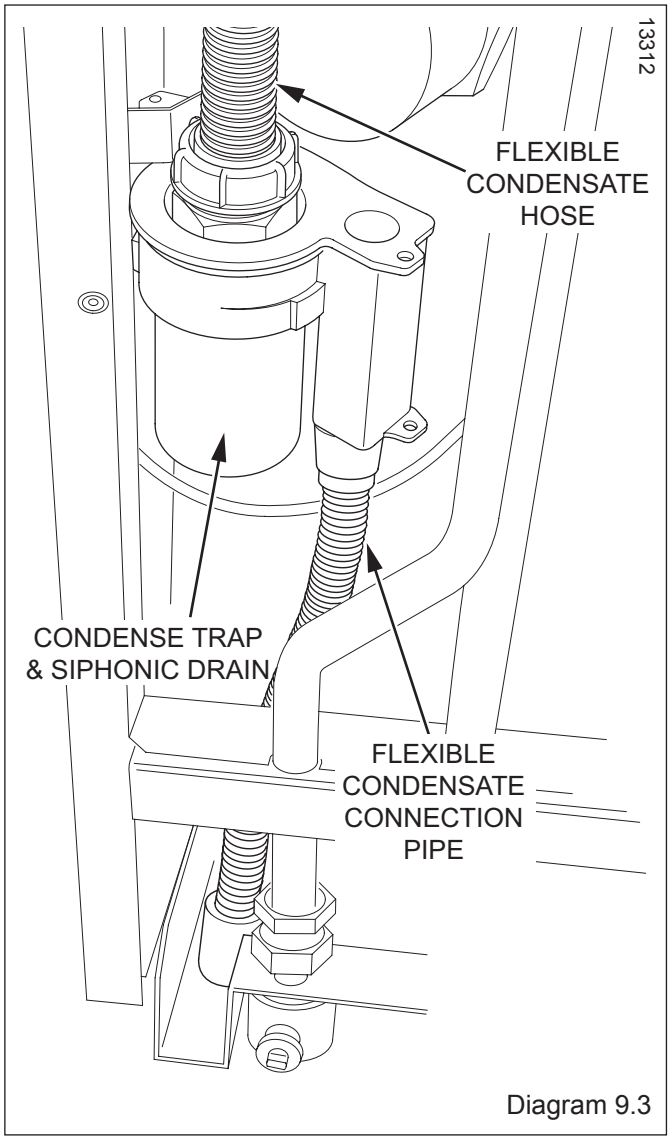


Diagram 9.3

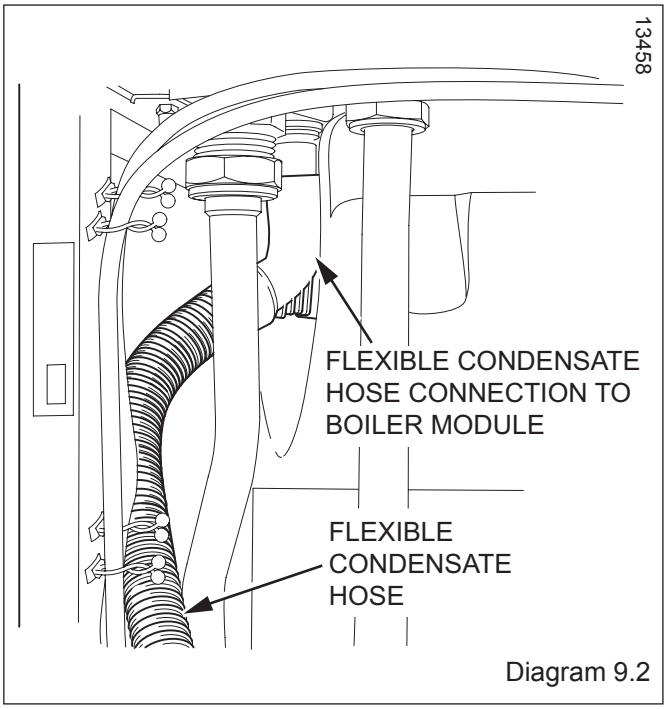


Diagram 9.2

10 Electrical Connection

WARNING: This appliance must be earthed.

● This appliance must be wired in accordance with these instructions. Any fault arising from incorrect wiring cannot be put right under the terms of the Glow-worm guarantee.

● All system components must be of an approved type.

Electrical components have been tested to meet the equivalent requirements of the BEAB.

● Do not interrupt the mains supply with a time switch or programmer.

● Connection of the whole electrical system and any heating system controls to the electrical supply must be through a common isolator.

● Isolation should preferably be by a double pole switched fused spur box having a minimum contact separation of 3mm on each pole. The fused spur box should be readily accessible and preferably adjacent to the boiler. It should be identified as to its use.

● A fused three pin plug and shuttered socket outlet may be used instead of a fused spur box provided that:

a) They are not used in a room containing a fixed bath or shower.

b) Both the plug and socket comply with the current issue of BS1363.

Immersion Heater - the thermostatically controlled immersion heater with manual reset is fitted to the cylinder as a back up for domestic hot water in the event of the boiler being inoperable, it MUST be wired separately from the boiler electrical connections.

The heater should be wired through a double-pole switch or controller having a minimum contact separation of 3mm on each pole. Use a cable size of at least 1.5sq. mm flexible cable, 85 deg.C rubber insulated HOFR sheathed to comply with BS6141 Table 8 and must be fully earthed.

10.1 Electrical Connection

Take the previously laid electrical cable and route along the left hand side of the tank module through the two grommets and the cable ties and across to the installers interface as shown in diagram 10.1.

Take the electrical cartridge from the loose items pack.

Remove the securing screw to open the cartridge.

NOTE: There are two screws supplied loose in the electrical cartridge, these will be required to secure the cartridge into the electrical interface housing.

Slacken the two screws of the cable strain relief in the electrical cartridge, see diagram 10.2.

Route the mains supply and systems cables through the strain relief and connect to the relevant plug dependant upon your choice of system controls, refer to relevant sections 10.2 and 10.3.

Initially, if system controls are not available then fit a wire link between “L” and “R”, this will allow the boiler to run continuously on heating.

Fit electrical cartridge into the interface housing on completion of the wiring, see diagram 10.3.

Secure with the two cartridge retaining screws provided in the cartridge body.

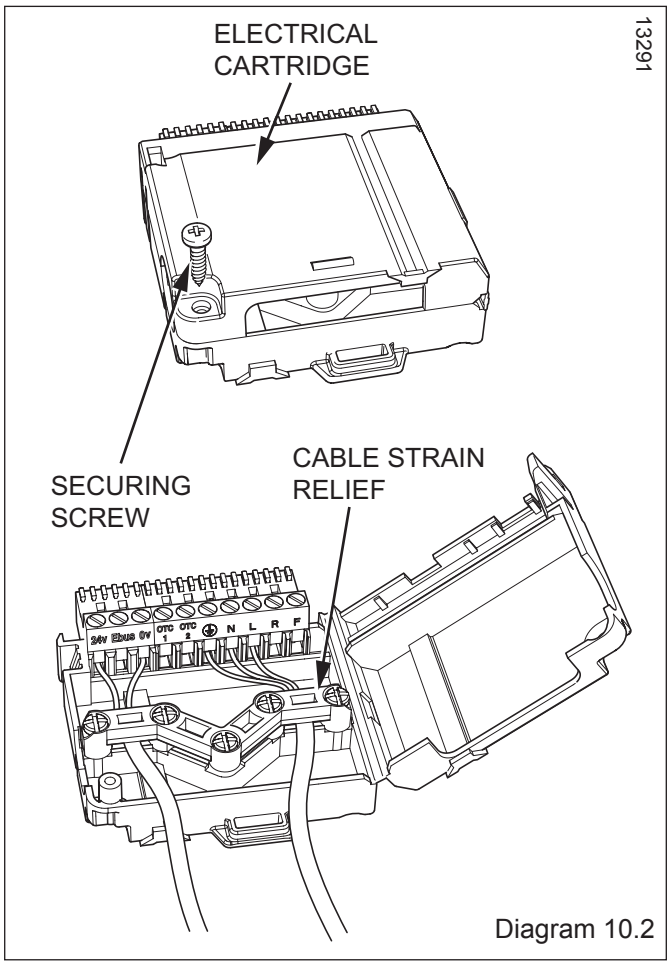


Diagram 10.2

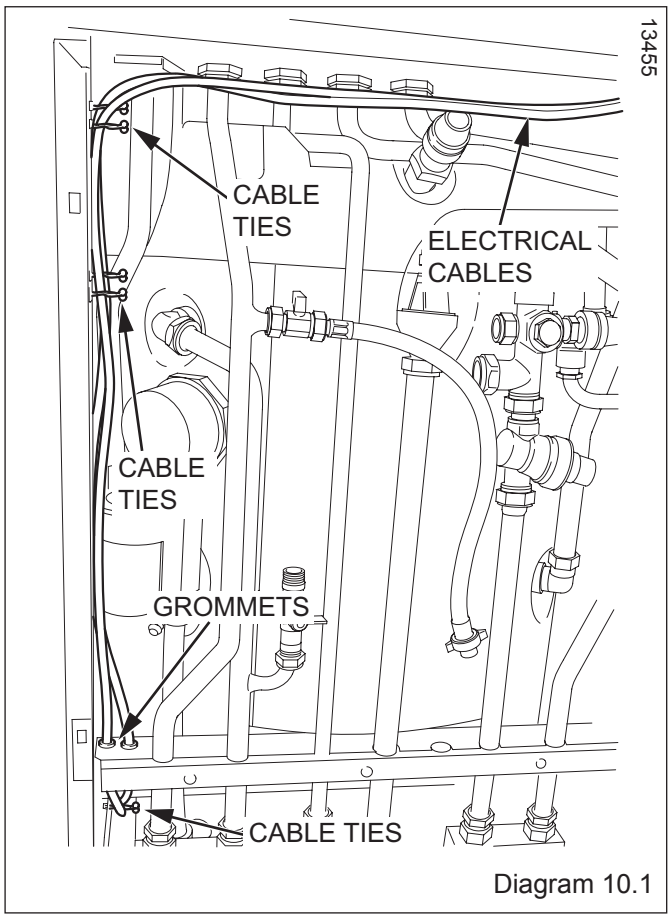


Diagram 10.1

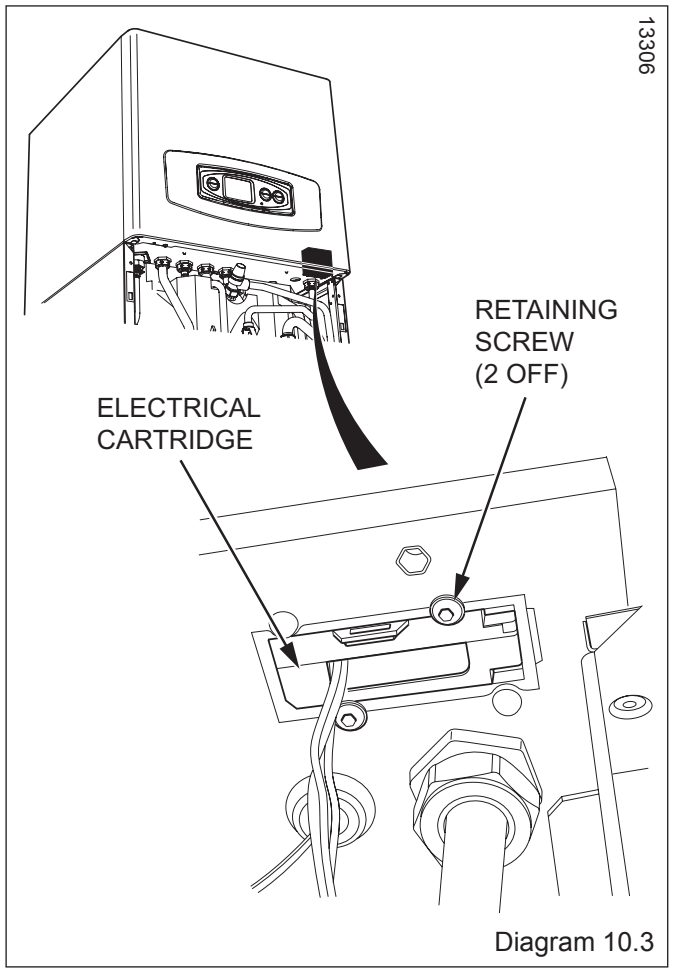
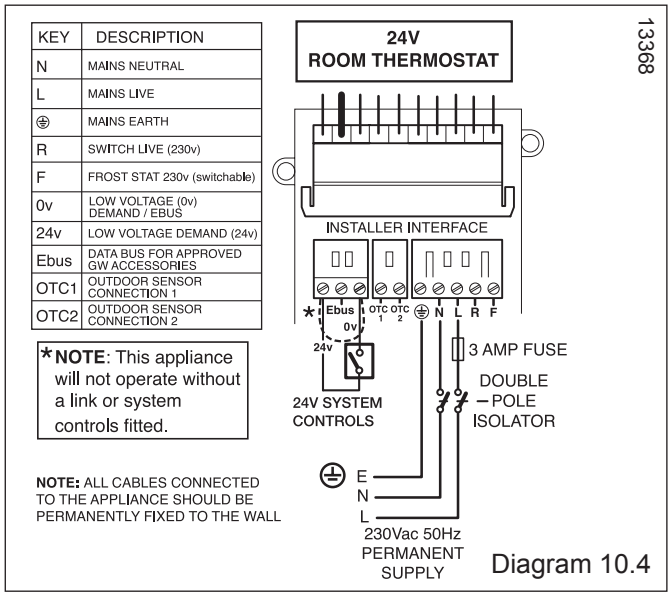
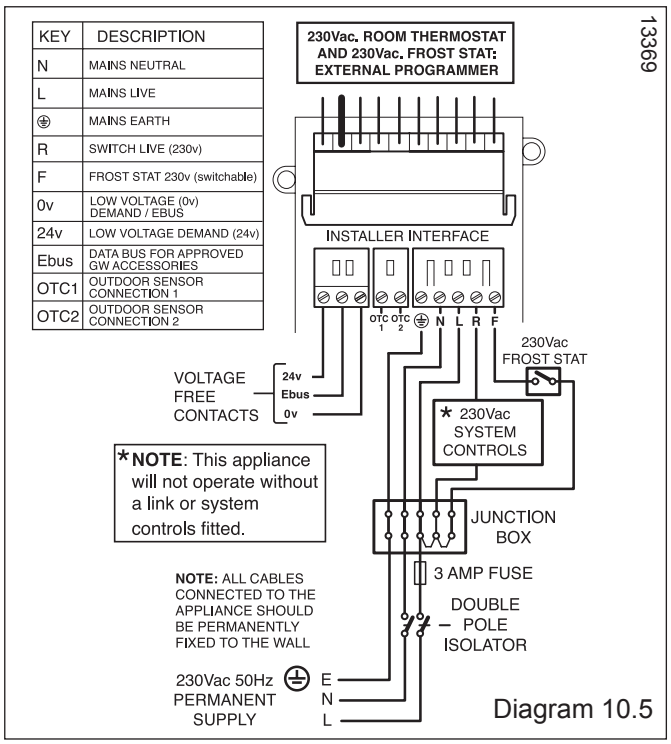
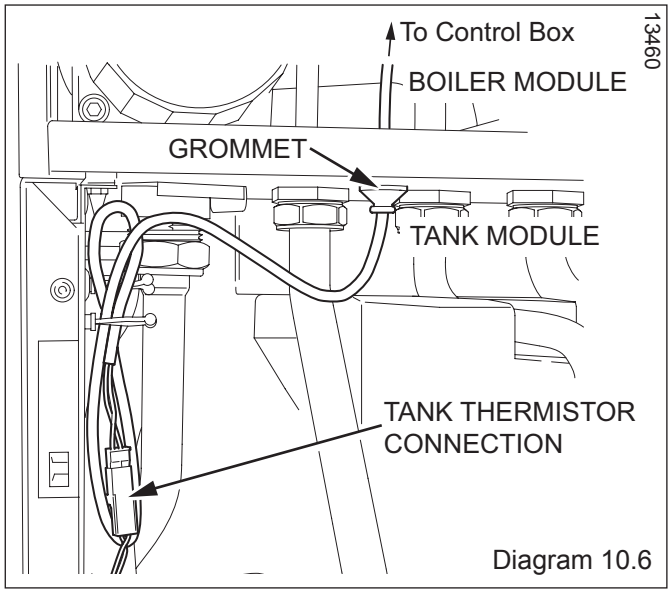


Diagram 10.3

10 Electrical Connection







10.2 System Controls 24V

WARNING: UNDER NO CIRCUMSTANCES MUST ANY MAINS VOLTAGE BE APPLIED TO ANY OF THE TERMINALS ON THE 24V CONNECTION PLUG.

Connect the mains supply and system heating controls e.g. room thermostat as diagram 10.4. External controls should be fitted in accordance with the rules in force.

If fitting a proprietary programmer as part of the system controls the internal central heating programmer will need to be disabled as described in section 10.4. If fitting the Glow-worm Climapro programmer the internal programmer will automatically be disabled.

10.3 Mains Voltage System Controls

WARNING: UNDER NO CIRCUMSTANCES MUST ANY MAINS VOLTAGE BE APPLIED TO ANY OF THE TERMINALS ON THE 24V CONNECTION PLUG.

Connect mains supply and system controls as diagram 10.5.

External controls should be fitted in accordance with the rules in force.

If fitting a proprietary programmer as part of the system controls the internal central heating programmer will need to be disabled as described in section 10.4. If fitting the Glow-worm Climapro programmer the internal programmer will automatically be disabled.

10.4 Disabling the internal CH Programmer

If fitting an external proprietary CH Programmer, it is necessary to disable the Internal Programmer.

a) Press and hold the ‘mode’ button for 5 seconds. The display will change to flashing ‘0’.
b) Use the ‘+’ or ‘-’ button to scroll to 96.
c) Press ‘MODE’ to confirm.
d) The display now shows a flashing ‘d. 0’ Use the ‘+’ or ‘-’ key to scroll to ‘d.92’.
e) Press ‘MODE’ to confirm.
f) The display now shows a flashing ‘3’ above the ‘d.92’.
g) Use the ‘+’ or ‘-’ button to change this value to ‘1’.
h) Press ‘MODE’ to confirm, ‘1’ stops flashing and is saved.
i) Press and hold ‘MODE’ to exit.

The CH Programmer has now been disabled. The DHW Programmer is still active. See the diagnostic menu instructions in the Fault Finding section for further details.

10.5 Tank Thermistor

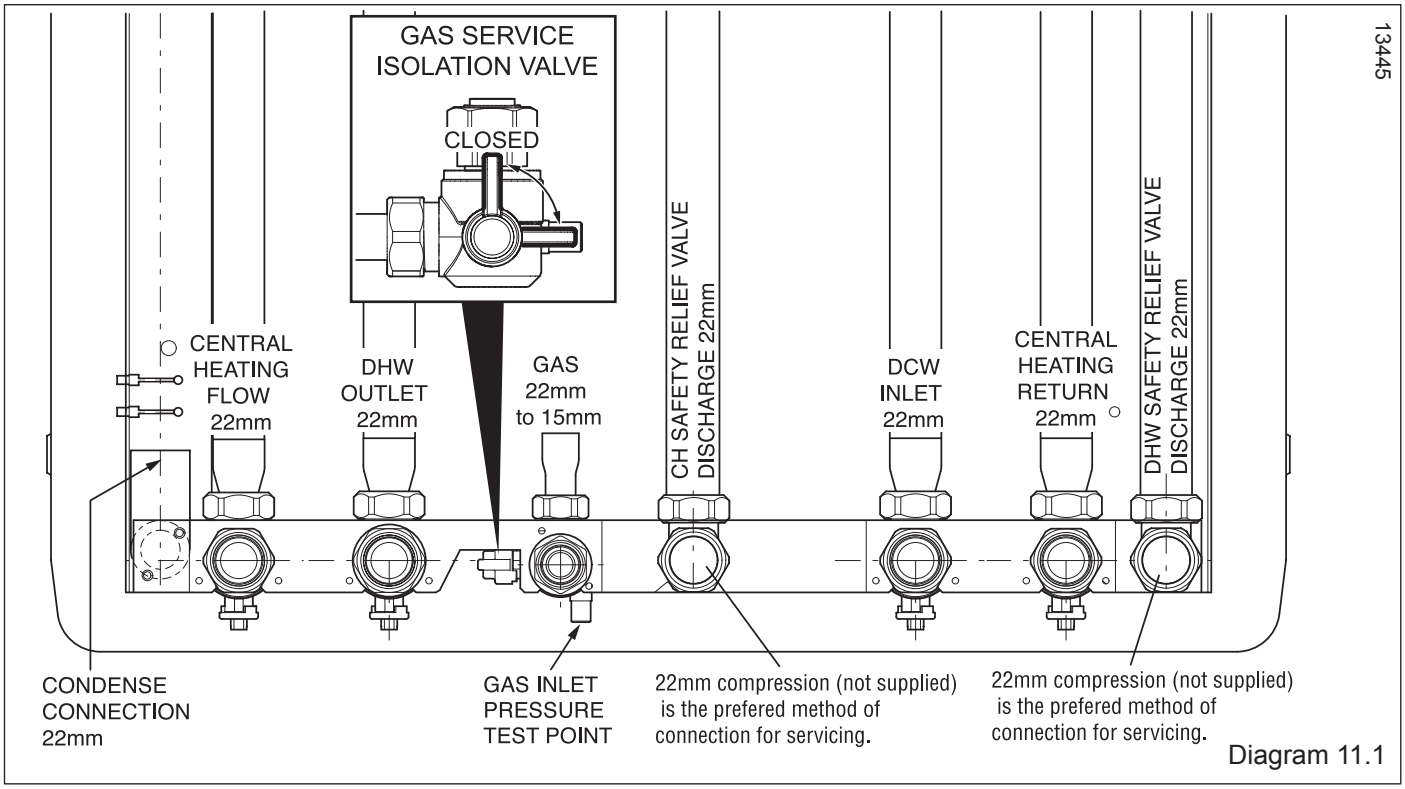
The tank thermistor should be connected between the boiler and tank modules. The cable and connection plug from the control box passes through a grommet on the base of the boiler module to the connection on the LH side of the tank module, see diagram 10.6.

10.6 Electrical Connections - Testing

Carry out preliminary electrical system checks as below:

1. Test insulation resistance to earth of mains cables.
2. Test the earth continuity and short circuit of cables.
3. Test the polarity of the mains.

11 Commissioning


13445
GAS SERVICE ISOLATION VALVE
CLOSED
CENTRAL HEATING FLOW 22mm
DHW OUTLET 22mm
GAS 22mm to 15mm
CH SAFETY RELIEF VALVE DISCHARGE 22mm
DCW INLET 22mm
CENTRAL HEATING RETURN 22mm
DHW SAFETY RELIEF VALVE DISCHARGE 22mm
CONDENSE CONNECTION 22mm
GAS INLET PRESSURE TEST POINT
22mm compression (not supplied) is the prefered method of connection for servicing.
22mm compression (not supplied) is the prefered method of connection for servicing.
Diagram 11.1

IMPORTANT: At the time of commissioning, complete all relevant sections of the Benchmark Checklist located in the inside back pages of this document.

11.1 Preliminaries - All Systems

Do Not operate the boiler without water.

The commissioning should be carried out by a **competent person** approved at the time by the Health and Safety Executive in accordance with the current issue of BS6798.

Make sure that the system has been thoroughly flushed out with cold water and that all cleanser if used has been removed.

Isolate the boiler from the mains electrical supply and test for gas soundness and purge air from the gas supply.

11.2 Filling Domestic Water Circuit

Make sure that the isolation valves are securely tightened. Open all domestic hot water taps.

Fully open the DHW outlet and DCW inlet valves, see diagram 11.1. Water will now flow through the boiler to the domestic water tank and to the hot water taps.

Starting at the lowest tap, turn the hot taps off one at a time until the hot water pipework is purged of air.

Carefully slacken, but DO NOT remove the air vent screw on the domestic pump to release any trapped air within the boiler, see diagram 11.2, secure when procedure completed.

NOTE: The water pressure at the vent point is that of the incoming water main (max 3.5bar due to pressure reducing valve).

Check for water soundness of the complete domestic water system.

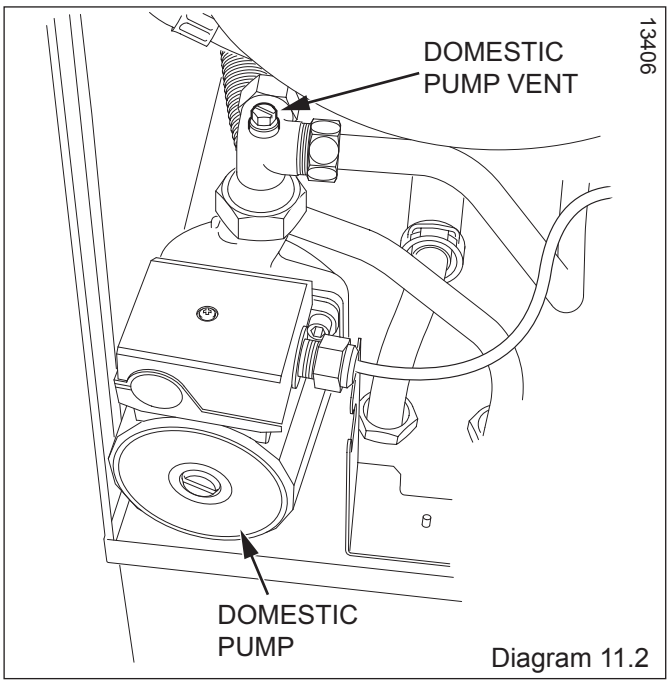


Diagram 11.2

11.3 Filling the Heating System

Refer to diagrams 11.1, 11.2 and 11.3.

With the boiler in place:

1. Ensure that the filling loop flexible hose is securely connected to the double check inlet valve.
2. Ensure that the gas service isolation valve is closed.
3. Switch on the power supply to the appliance.

   The boiler should be in OFF mode. This is indicated by the 'OFF' symbol on the user interface display. If not, press the 'mode' button repeatedly until the 'OFF' symbol is displayed.

   The display will now show a flashing system pressure.

4. Fully open the taps on the filling loop to fill the heating system to a pressure of 1.0bar. Close the filling taps. If the domestic cold water is below 10°C the tank frost protection may operate and a F1 will be displayed, clear by pressing “Reset”, you may have to repeat this process until the pressure is 1 bar.
5. Vent all air from the system and vent the CH pump via the front screw - repeat step 4 as necessary until the system is full and all the air has been removed.
6. Make sure that the automatic air vent works correctly and that the black cap is loosely fitted to allow air to escape.
7. To comply with the water regulations the flexible hose must be disconnected from the double check inlet valve - undo the nut and pull the flexible hose from the valve.

11.4 Initial Lighting

NOTE: The combustion for this appliance has been checked, adjusted and preset at the factory for operation on natural gas (G20) as defined on the appliance data label.
No measurement of the combustion is necessary.
Having checked :

- the appliance has been installed in accordance with the instructions.
- the integrity of the flue system and flue seals.
- the integrity of the appliance combustion circuit and relevant seals.
- that all internal/external controls are calling for heat.
- the gas service isolation valve, diagram 11.1, is open.

LPG Conversion: See section 11.11.

As an option, a chargeable boiler performance and function service can be provided by Glow-worm Service by calling telephone No. 01773 828100.

Light the appliance by following the procedure below:

Refer to diagram 11.4 and repeatedly press the “MODE” button

until the and symbols are displayed.

The hot water tank has priority over central heating.

The appliance will enter a self-checking routine then the ignition sequence will commence.

The digital display will show the tank temperature setting in hot water mode.

If the burner fails to light the fan will stop. Initially this may be due to air in the gas supply line. The boiler will automatically have five attempts at ignition.

If the burner fails to ignite the display will show F1.

Depress the “reset” button on the fascia to clear the display and repeat the ignition sequence.

When the tank is full (and after a short pump overrun period) a central heating demand will be initiated.

Once the system has been purged of air set the hot water to the desired temperature by using the hot water “+” and “-” buttons.

Open a hot water tap, check that hot water is available and then close the hot water tap.

Set the central heating water temperature to the desired temperature by using the central heating “+” and “-” buttons.

The appliance will then continue to fire in central heating mode until the user controls are satisfied or there is another demand made for hot water.

NOTE: After ignition in central heating demand the boiler will remain at minimum power for one minute before going to full rate

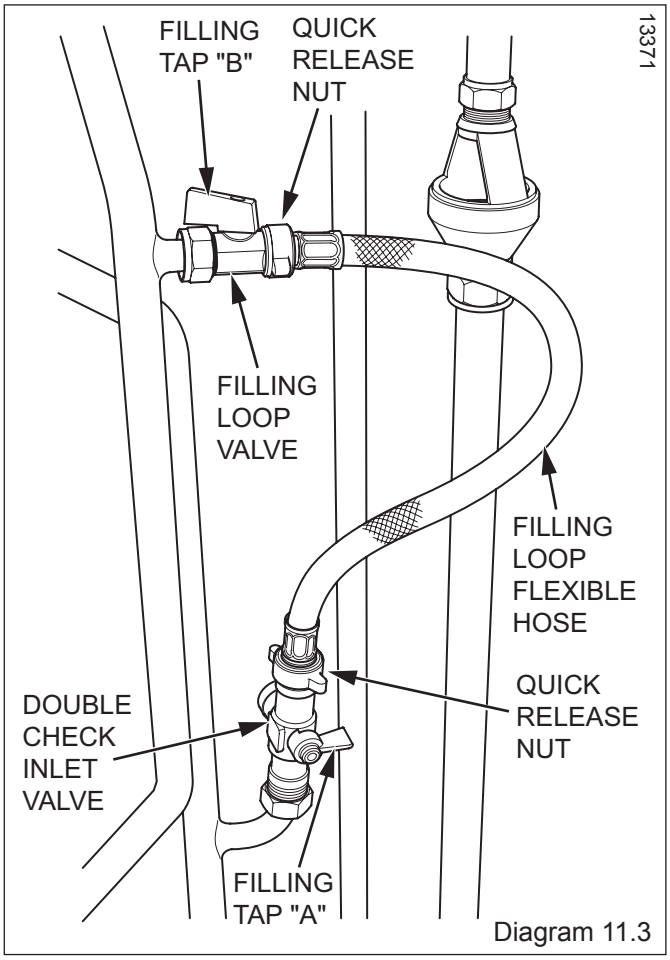
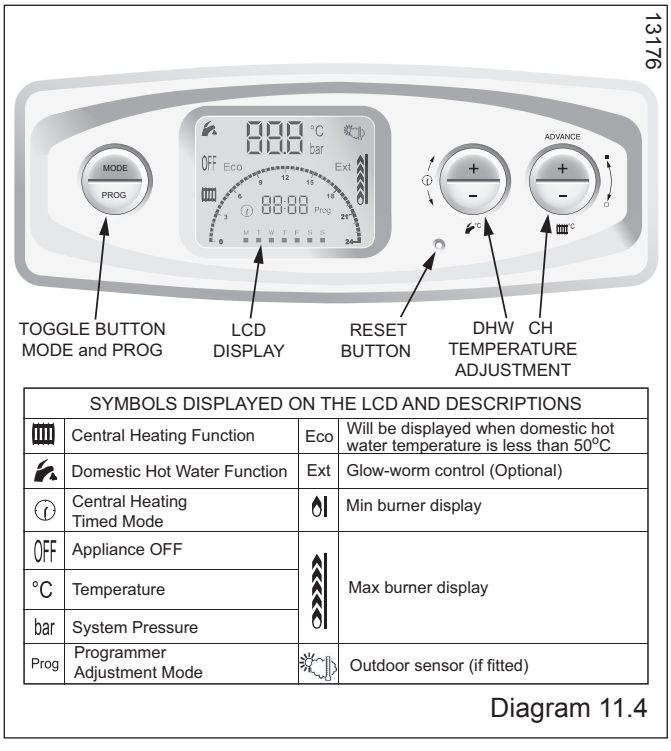


Diagram 11.3



SYMBOLS DISPLAYED ON THE LCD AND DESCRIPTIONS			
	Central Heating Function	Eco	Will be displayed when domestic hot water temperature is less than 50°C
	Domestic Hot Water Function	Ext	Glow-worm control (Optional)
	Central Heating Timed Mode		Min burner display
OFF	Appliance OFF		Max burner display
°C	Temperature		
bar	System Pressure		
Prog	Programmer Adjustment Mode		Outdoor sensor (if fitted)

Diagram 11.4

11 Commissioning

11.5 Re-pressurising System (if required)

1. Ensure that the filling loop flexible hose is securely connected to the double check inlet valve, see diagram 11.3.
2. Fully open tap"A", then gradually open tap "B" to fill the heating system to a pressure of 1.0bar. When completed close the filling taps.
3. Vent all air from the system - repeat step 2 as necessary until the system is full and all the air has been removed.
4. **IMPORTANT:** To comply with the water regulations the flexible hose must be disconnected from the double check inlet valve - undo the nut and pull the flexible hose from the valve.

11.6 Gas Inlet Pressure and Gas Rate

The supply from the governed meter must be of adequate size to provide a steady inlet working pressure of 20mbar (8in wg) at the boiler. On completion, test the gas installation for tightness using the pressure drop method and suitable leak detection fluid, purge as necessary.

NOTE: Due to the modulating operation of the boiler and the need to check the gas inlet pressure and measure the gas rate at maximum rate, it will be necessary to force it to maximum.

Press the "reset" button on the controls fascia, release and immediately press and hold in the "+" button. After approximately 5 seconds "Hi" will be displayed. Pressing the mode button when "Hi" is selected will force the boiler to maximum rate, the display will flash between "Hi" and the "default display" this will indicate the boiler has been forced to maximum.

Operational Gas Inlet Pressure

With ALL other gas appliances operating, check the operational supply pressure at the gas service isolation valve test point, see diagram 11.1.
The nominal supply pressure for Natural Gas (G20) is 20mbar.
The nominal supply pressure for LPG (G31) is 37mbar.
Turn the taps and appliances off, then disconnect the pressure gauge.

NOTE: If you require to measure the gas inlet pressure at the gas valve there will be a pressure drop over the gas service isolation valve, this is normal and the inlet pressure can be up to 2mbar less.
Additionally the safe nominal maximum heat input of the appliance can be achieved at an inlet pressure down to 15mbar.

NOTE: The **BURNER PRESSURE** cannot be measured.

Gas Rate

Make sure that ALL other gas burning appliances and pilot lights are off.
Check the gas rate using the gas meter test dial and stop watch, at least 10 minutes after the burner has lit, see table opposite for approximate rates.
In communal or LPG installations where the gas rate cannot be measured it is acceptable to measure the combustion rate as described in the servicing section.
On completion, press the "mode" and "+" buttons simultaneously, this will reset the boiler.

11.7 Range Rating

The boilers are fully modulating for central heating, and it is therefore not necessary to range rate the boiler. However, if desired, it is possible to range rate the boiler between 9 and 24kW in 1kW increments, refer to diagram 11.4, then:

a) Press and hold the 'MODE' button for 5 seconds. The display will change to flashing '0'.
b) Use the '+' or '-' button to scroll to 96.
c) Press 'MODE' to confirm.
d) The display now shows a flashing 'd. 0'. The part load setting is displayed above in kW
e) Press 'MODE' to change, use the '+' or '-' button to change this value to the desired setting.
h) Press 'MODE' to confirm, the new setting has been saved.
i) Press and hold 'MODE' to exit.

NOTE: For approximate gas rates at part load, refer to table opposite.

11.8 Water Systems

Check that all external controls are calling for heat, the boiler will fire automatically. Fully open all radiator valves and the flow control valve, if fitted, see diagram 4.1.

Balance the radiators as required and if fitted, adjust the flow control valve to give the required system differential. Turn off all radiators that can be shut off by the user and check to see if less than the maximum differential allowed of 20°C can be achieved across flow and return.

The pump has two speeds and can be adjusted depending on the requirements of the central heating system, see diagram 4.2.

The boiler has an inbuilt automatic adjustable bypass valve. The pressure can be adjusted between approx 1.5 and 3.5mH_2O but is factory pre-set to approx 2.5mH_2O. The pressure changes by approx 0.1mH_2O for each full turn of the bypass screw, see diagram 12.5. Turning clockwise increases the pressure and turning anti-clockwise decreases the pressure.

Allow the system to reach maximum temperature then switch off the boiler by isolating from the electrical supply.

Lock or remove the flow control valve handle (if fitted).

Adjust the boiler temperature controls and any system controls to their required settings.

We recommend that the domestic hot water should be run for a short period until clear.

kW	m3/hr	ft3/hr	kW	m3/hr	ft3/hr
24	2.5	88.6	16	1.7	58.9
23	2.4	84.7	15	1.6	55.4
22	2.3	81.2	14	1.5	51.5
21	2.2	77.3	13	1.4	48.0
20	2.1	73.8	12	1.3	44.1
19	1.1	69.9	11	1.2	40.6
18	1.9	66.4	10	1.0	36.7
17	1.8	62.9	9	0.9	33.2

11 Commissioning

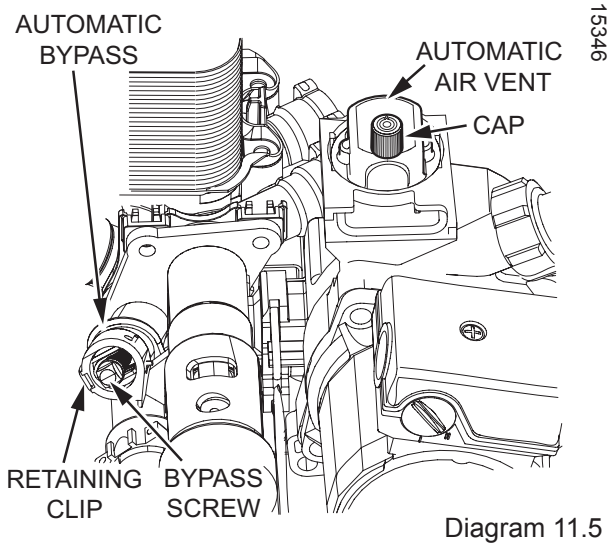


Diagram 11.5

11.9 Completion

Fit the boiler module front panel, see diagram 8.2.

Fit the tank module front panel, this is a push-fit.

Ensure that the magnetic lighting instruction label is placed on the surface of the boiler casing

GB: It is a requirement that the “Benchmark” Installation, Commissioning and Service Record is completed and left with the user.

IE: it is necessary to complete a “Declaration of Conformity” to indicate compliance to I.S.813. An example of this is given in the current edition of I.S.813.

11.10 Instruct the User

● Demonstrate, then instruct the User about the lighting procedure and heating system controls operation.

● Advise that to ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the installation conditions and usage, but in general, once a year should be enough.

● Draw attention, if applicable, to the current issue of the Gas Safety (Installation and Use) Regulations, Section 35, which imposes a duty of care on all persons who let out any property containing a gas appliance in the UK.

● The user shall not interfere with or adjust sealed components.

● It is the Law that any servicing is carried out by a competent person approved at the time by the Health and Safety Executive.

● Advise the user that, like all condensing boilers this appliance will produce a plume of condensation from the flue terminal in cool weather. This is due to the high efficiency and hence low flue gas temperature of the boiler.

● Advise the user of the precautions necessary to prevent damage to the system, boiler and the building, in the event of the heating system being out of use during frost or freezing conditions.

● Advise the user that the permanent mains electrical supply SHOULD NOT be switched off, as the built in frost protection and pump saver program will not operate.

● Advise the User if the mains electricity and gas are to be turned off for any long periods during severe weather, it is recommended that the whole system, including the boiler, should be drained to avoid the risk of freezing.

Note: Sealed System: Contact your installation/servicing company as draining, refilling and pressurising MUST be carried out by a competent person approved at the time by the Health and Safety Executive.

● Leave these instructions and the ‘Benchmark’ Installation, Commissioning and Service Record with the user.

11.11 LPG CONVERSION

Do Not operate the boiler without water.

During the conversion to Propane use of a suitable flue gas analyser is necessary.

Ensure that the appliance supply pressure = 37mbar.

(1) To access the gas valve you will need to remove the silencer tube, see diagram 12.7 and section 12.2.

(2) Refer to diagram 12.13 and turn the gas valve throttle fully clockwise using a small flat blade screwdriver.

(3) Turn the throttle back anti-clockwise by $2^{1}/_{4}$ turns.

(4) Ensure that the gas analyser is set to the correct fuel setting - Propane.

(5) Attach combustion analyser to the combustion test point. See diagram 12.1.

NOTE: Before measuring combustion the silencer must be replaced.

(6) Turn on the gas service isolation valve, see diagram 11.1.

Turn on the electrical supply, the appliance will begin the ignition sequence.

Monitor the combustion reading and after 5 mins at max rate, the reading should be:-

G31 - 10.2% ± 0.5 case on, 10.0% ± 0.5 case off after 5 minutes.

To achieve maximum rate (input) press the “reset” button on the controls fascia, release and immediately press and hold in the “+” button. After approximately 5 seconds “Hi” will be displayed.

Pressing the mode button when “Hi” is selected will force the boiler to maximum rate, the display will flash between “Hi” and the “default display” this will indicate the boiler has been forced to maximum.

If adjustment proves necessary then proceed as follows:

Adjust the maximum rate CO_2 by turning the throttle anti-clockwise to increase, clockwise to decrease, see diagram 12.13.

NOTE: Adjust only in very small increments (approx. $^{1}/_{16}$ turn) and wait approx. 1 minute after each adjustment until the value stabilises.

To exit the check sequences press the “+” button, this will reset the boiler to the default display.

(7) Remove analyser probe from the test point and replace the cap.

(8) **IMPORTANT: Fit the LPG conversion label supplied in the documentation pack to the base panel alongside the data label. Ensure the silencer is fitted and front panel replaced.**

12 Servicing

IMPORTANT NOTES:

1. To ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the particular installation and usage, but in general once a year should be enough.
2. It is the Law that any servicing is carried out by a **competent person** approved at the time by the Health and Safety Executive.
3. Before commencing with a service or replacement of parts the boiler should be isolated from the electrical supply and the gas supply should be turned off at the gas isolation valve.
4. When replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Glow-worm.
5. If any electrical connections have been disconnected and after their connection, checks to the earth continuity, polarity, short circuit and resistance to earth must be repeated using a suitable multimeter, as described in section 13.
6. After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located in the inside back pages of this document.

General Inspection

Prior to, during servicing and after any maintenance or changed parts, the following must be checked.
● The integrity of the flue system and flue seals.
● The integrity of the appliance combustion circuit and relevant seals.
● Electrical, gas and water connections.
● System pressure.
● the combustion performance, refer to the following procedure.
● The operational gas inlet pressure and gas rates, refer to the commissioning section paragraph 11.7.
Correct any fault before continuing.

COMPETENCY TO CARRY OUT THE CHECK OF COMBUSTION PERFORMANCE

NOTE: BS 6798: 2009 Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70kW net advises that:
● The person carrying out a combustion measurement must be assessed as competent in the use of a flue gas analyser and the interpretation of the results.
● The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers' requirements.
● Competence can be demonstrated by satisfactory completion of the CPA1 ACS assessment, which covers the use of electronic portable combustion gas analysers in accordance with BS 7967, parts 1 to 4.
● Ensure that the gas analyser is set to the correct fuel setting.
● Select the "🔥", constant central heating with DHW function by pressing the "Mode" button repeatedly, refer to commissioning section. The boiler should fire automatically.
NOTE: Safe combustion can only be verified by measuring CO/CO2 ratio. This must not exceed the value shown in the table opposite.

COMBUSTION CHECK AND SETTING THE AIR/ GAS RATIO VALVE

● Remove the front casing panel, see diagram 12.2 and hinge down the control box. Taking care not to touch any internal components, proceed as follows:
● Connect the CO2 combustion analyser to the relevant test point, see diagram 12.1.

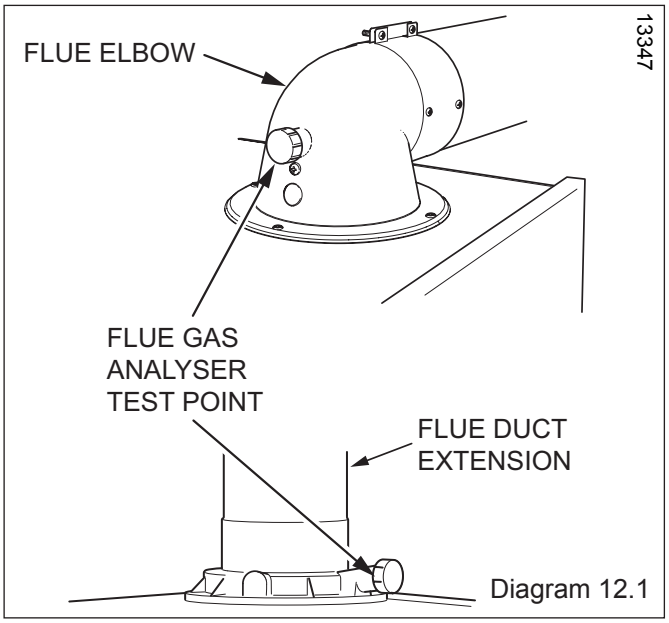


Diagram 12.1

GAS RATES (G20) (approx) after 10 mins from cold					BURNER % CO_2 (nominal)		
Model	MIN m^3/h	MIN ft^3/h	MAX m^3/h	MAX ft^3/h	(Case On)	(Case Off)	CO/CO_2 RATIO
100sxi	0.48	16.8	3.30	116.5	9.2 ± 0.5	9.0	0.004
170sxi	0.48	16.8	3.30	116.5	9.2 ± 0.5	9.0	0.004

13760

GAS RATES (G31) (approx) after 10 mins from cold			BURNER % CO_2 (nominal)		
Model	MIN kg/hr	MAX kg/hr	(Case On)	(Case Off)	CO/CO_2 RATIO
100sxi	0.7	2.4	10.2 ± 0.5	10.0 ± 0.5	0.004
170sxi	0.7	2.4	10.2 ± 0.5	10.0 ± 0.5	0.004

14052

1. Maximum Rate Check and Adjustment

NOTE: To verify the maximum gas rate CO2 setting the appliance must be checked at the maximum rate first. Press the "reset" button on the controls fascia, release and immediately press and hold in the "+" button. After approximately 5 seconds "Hi" will be displayed. Pressing the mode button when "Hi" is selected will force the boiler to maximum rate, the display will flash between "Hi" and the "default display" this will indicate the boiler has been forced to maximum. Wait until the CO2 value is stable and check that the value is within the range specified in table in the "check" column.

If the combustion reading is not within the acceptable values AND the integrity of the complete flue system and combustion circuit seals have been verified and the inlet gas pressure (and gas rate) have been verified, then, it will necessary to adjust the combustion rate of the appliance.
NOTE: Adjustment is made by turning the gas valve throttle an ⅛ of a turn, waiting 1 minute to allow the appliance to stabilise before checking or making further adjustments.
● Remove the sticker covering the “throttle” adjustment screw, if fitted.
● Rotate the “throttle” (anti-clockwise to increase), to the required CO2, refer to diagram 12.13 and the “SETTING” column in the table.
● Exit the forced rate function, press the “mode” and “+” buttons simultaneously, this will reset the boiler to the default display. Now proceed to check the minimum rate adjustment.

GAS RATE CHECK

Check the gas rates as described in the commissioning section.

COMPLETION

If it is not possible to achieve the required results for either the combustion or gas rates, it will be necessary to complete a full service of the appliance and then repeat the combustion check procedure. If after servicing and adjustment of the appliance the combustion values are still unacceptable and after further remedial work has been carried out, the appliance must be disconnected until the CO/CO2 ratio is acceptable. Advice can be sought from the Glow-worm Technical Helpline.

12.1 Servicing

NOTE: If the Combustion CO2, CO/CO2 ratio and Gas rate checks did not require adjustment then it will not be necessary to complete a full service.

All routine servicing requirements can be achieved by the removal of the front panels, see diagram 12.2.

Position the control box and domestic expansion vessel into their service positions, see diagrams 12.3 to 12.6.
Before commencing with a service or replacement of parts. The boiler should be isolated from the electrical and gas supplies see diagram 11.1 for the position of the gas service isolation valve.

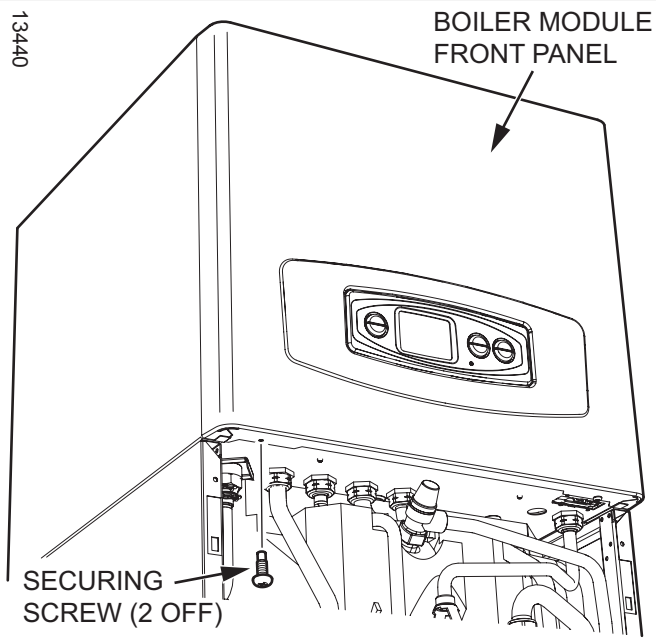
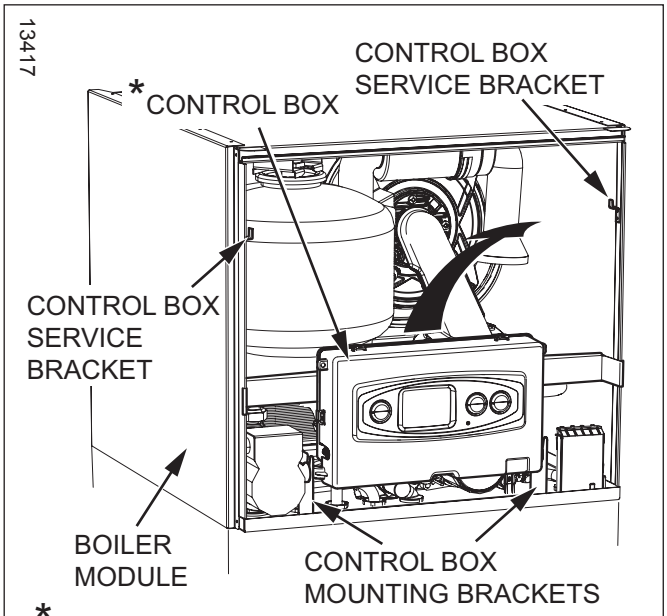


Diagram 12.2



* To move the control box into its service position carefully pull the control box forwards and upwards to release from its mounting brackets.

Diagram 12.3

12.2 Silencer

For access to the heat exchanger the silencer will need to be removed, see diagram 12.7.

Remove the securing screw and pull the silencer from the gas valve, this is a push fit.

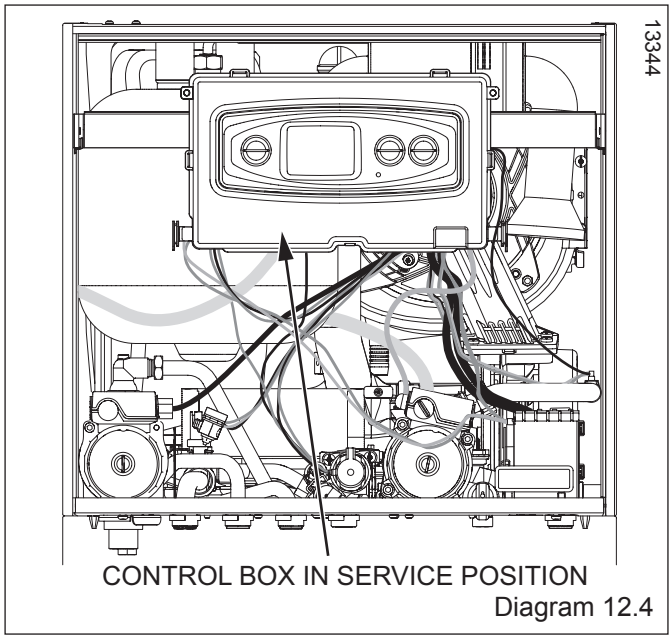


Diagram 12.4

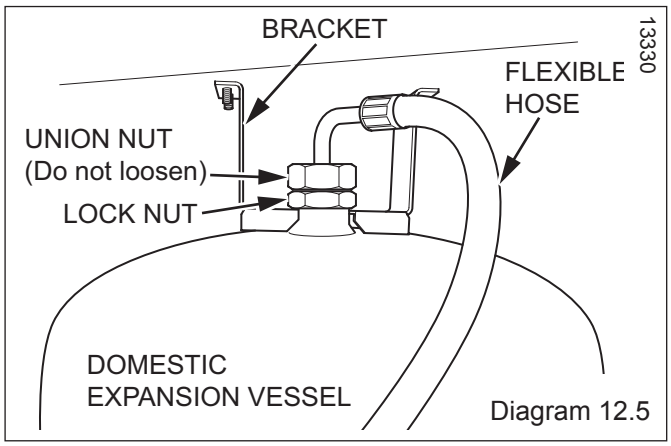


Diagram 12.5

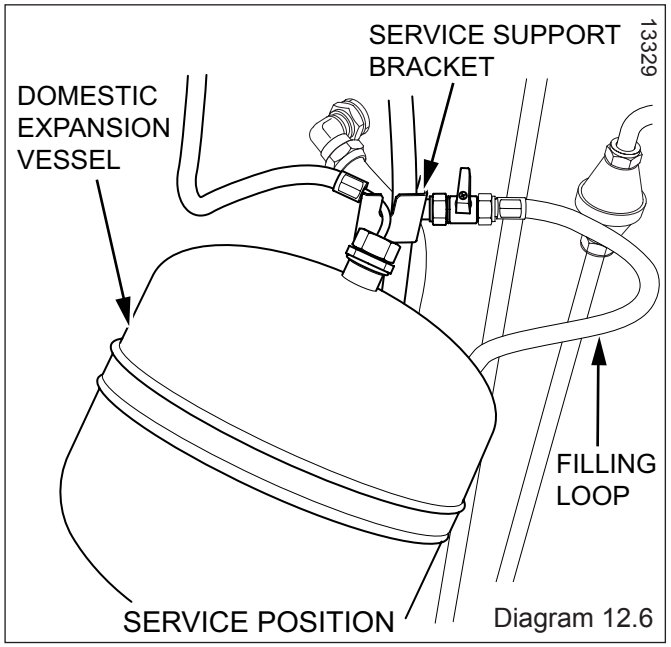


Diagram 12.6

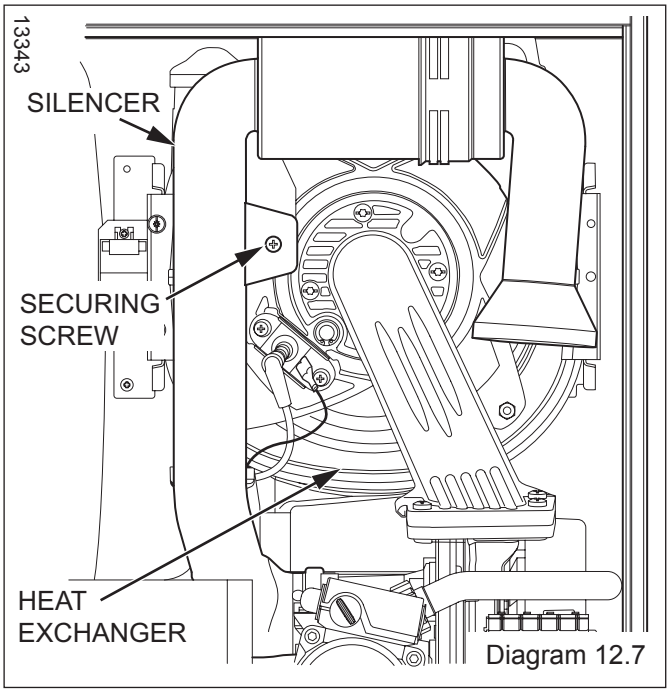


Diagram 12.7

12.3 Spark Electrode

NOTE: **If the functional checks did not indicate poor combustion then it is not necessary to service this component.**

Disconnect the spark electrode plug and earth lead. Remove the two securing screws and withdraw the spark electrode carefully from the combustion chamber, see diagrams 12.8 and 12.9.

Inspect the tips for damage.

Clean away any debris and check the spark gap is 3.5 to 4.5mm.

Check the electrode gasket for signs of damage and replace if necessary.

NOTE: If the burner is not to be serviced, do not perform the following instructions 12.6, 12.7, 12.8 and 12.9 but continue to section 12.10 to complete the servicing.

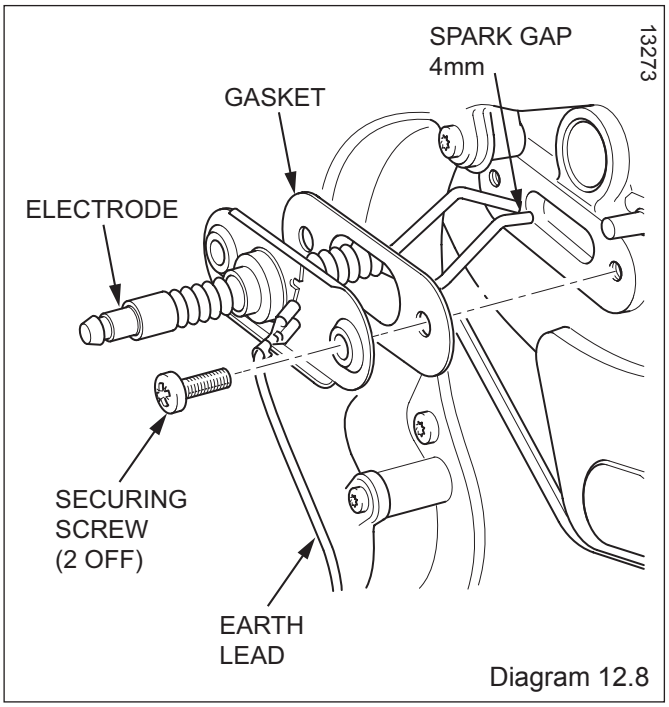


Diagram 12.8

12.4 Burner

NOTE:

● The following procedure will require that you replace the burner door seal and nyloc nuts.

● Removal of the burner is not necessary during a normal service, but if it is removed it will require a new gasket, see diagram 12.12.

● When replacing ensure that the sealing grommet, situated below the gas valve is correctly re-seated.

Slacken the gas connection at the union nut between the boiler module and tank module.

Remove the gas supply pipe securing clip and withdraw the gas pipe from gas valve, see diagram 12.10.

Disconnect the electrical connection at the gas valve and disconnect the electrical connection from the fan, see diagram 12.10.

Disconnect the ignition lead and earth lead from the burner door, see diagram 12.9.

Disconnect the flue overheat thermostat, see diagram 12.11.

Remove the four burner door nyloc nuts, one of these also holds the silencer bracket, see diagram 12.11.

Gently remove the fan, gas valve and burner assembly from the combustion chamber, taking care not to trap the primary return thermistor electrical cables.

Clean the burner with a soft brush taking great care not to damage the front insulation. DO NOT use wire or sharp instruments to clean the holes of the burner. Inspect the burner for any signs of damage.

Remove and discard the burner door seal and replace with new.

12.5 Heat Exchanger

Refer to diagram 12.11.

Remove loose debris from inside the heat exchanger using a soft brush and vacuum cleaner.

Carefully flush by spraying water into the heat exchanger, any remaining debris should pass through the condensate trap (Ensure the water is kept away from electrical components).

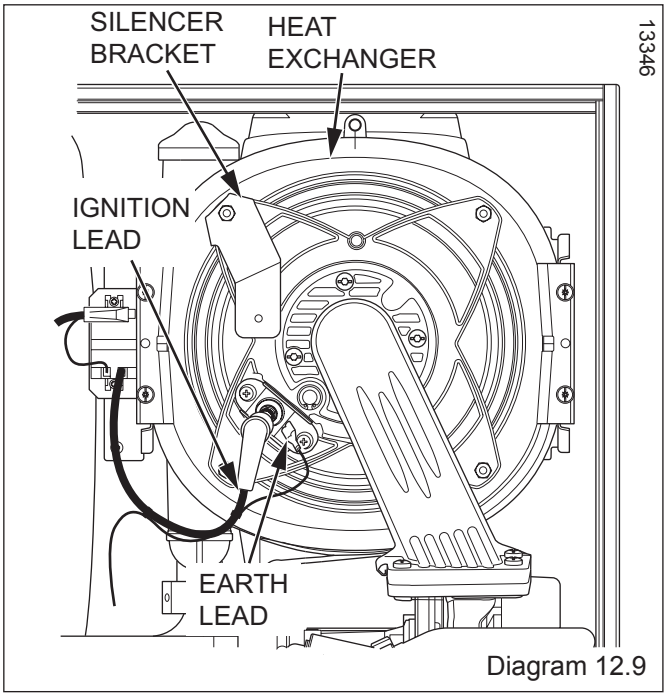


Diagram 12.9

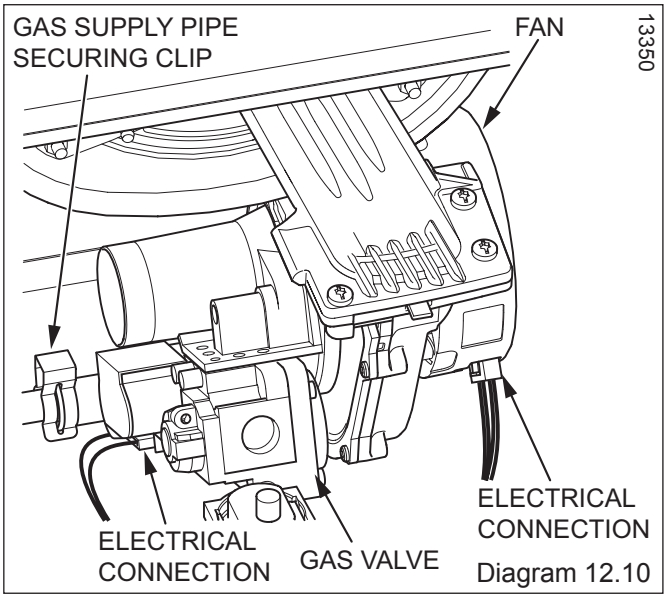


Diagram 12.10

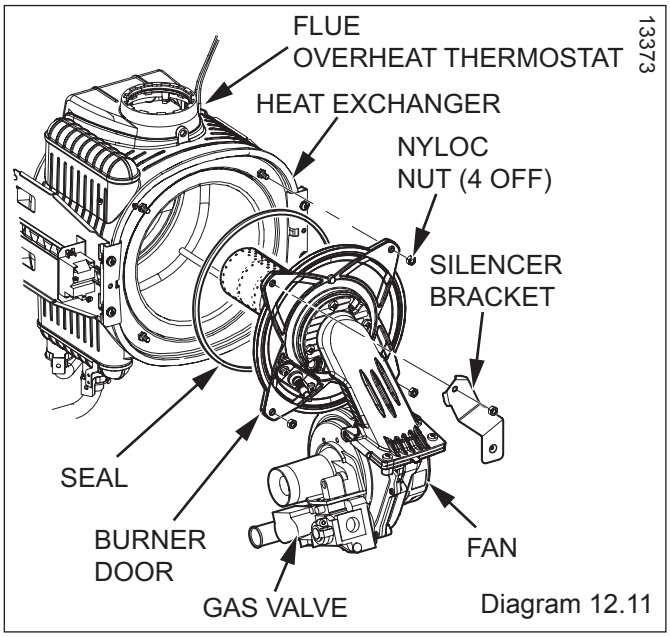


Diagram 12.11

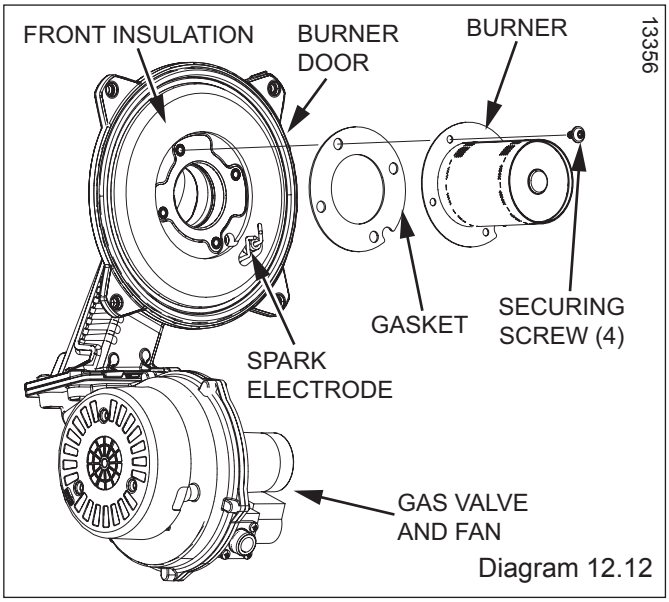


Diagram 12.12

12.6 Condense Trap and Siphonic Drain

The condensate trap & siphonic drain does not normally need servicing unless material deposits exceed beyond the service fill level, see diagram 12.14.

To clean the condense trap remove the sump and rinse with water.

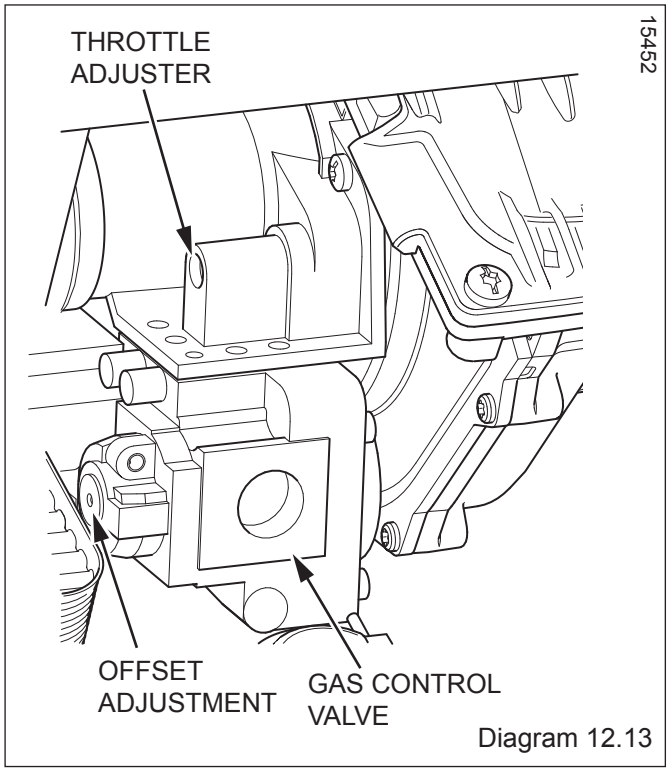


Diagram 12.13

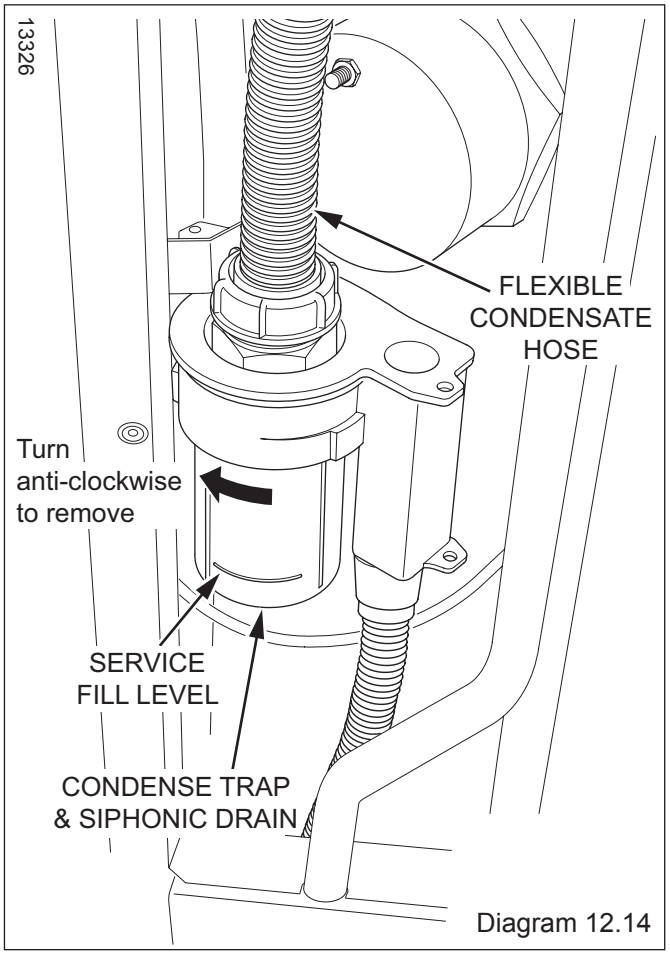


Diagram 12.14

12.7 Boiler Module Front Casing Panel Seal Check

Check the condition of the seal, if worn or damaged remove the seal and thoroughly clean the casing surface before fitting the new seal, see diagram 12.15.

Refit the casing panel.

NOTE: Ensure the seal is fitted correctly giving an airtight joint.

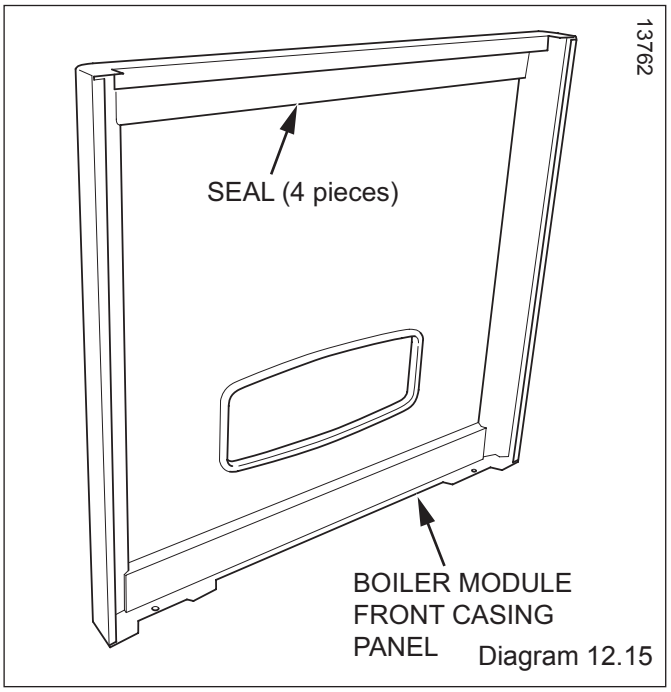


Diagram 12.15

13 Fault Finding

13.1 Preliminary fault finding

The following checks should be performed before proceeding onto specific diagnostics:

- Check the external electrical supply to the boiler is on and a supply of 230V is present at the 'L' and 'N' terminals at the installer interface.
  For access remove and open the electrical cartridge, see diagrams 10.3. and 10.2.
  Test at the 'L' and 'N' terminals on the installer interface, refer to diagrams 10.2 and 13.1.
- Check the electrical installation and appliance, carry out tests for earth continuity, polarity, short circuit and resistance to earth, using a suitable multimeter.
  An aid to test
  Remove the tank module front panel to gain access to the boiler module front panel securing screws, see diagram 12.1. Hinge down the control box and unclip the cover. to gain access to the main PCB.
  Carry out the tests at connector plug X17, see diagram 13.1. Check chassis earth at a bare metal point on the boiler.
- Check that there is a gas supply to the boiler and the gas service isolation valve is turned on, see diagram 11.1.
- Check pressure at the gas service isolation valve, refer to section 11.6.
- Check that the heating system pressure indicates at least 1mb, if not, fill and vent the system as described in section 11.3.
- Check that all external controls are on.
- Check the functional flow diagram, 13.3.

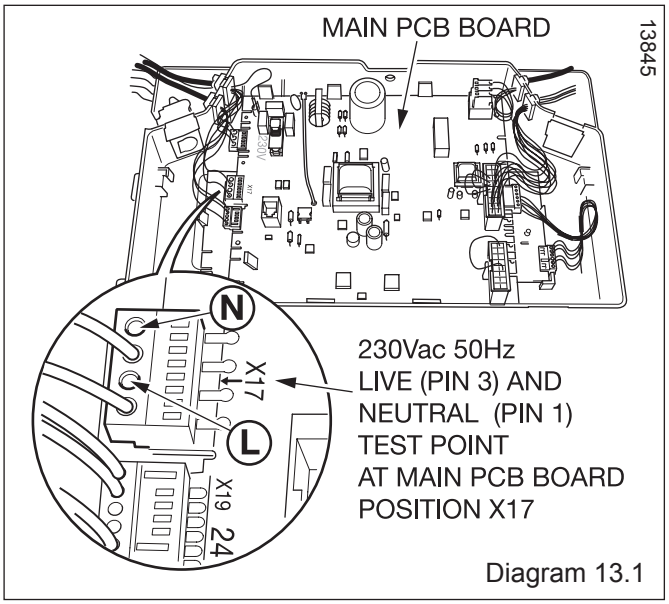


Diagram 13.1

13.2 Fault Memory

The Fault memory stores details of the ten most recent faults.

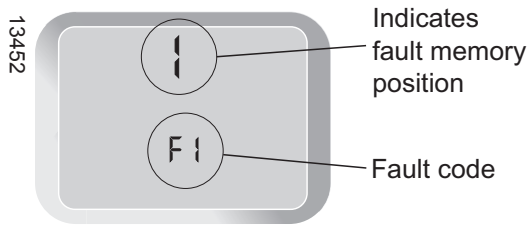
To access this menu:

a) Press and hold 'MODE' for 5 seconds.

b) When the display shows a flashing '0' press 'MODE' button.

c) Press a '+' button to scroll back through the fault memory (Position 1 is most recent), see fault memory display.

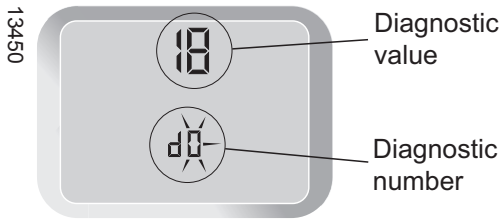
To exit this menu, press the 'MODE' button.



Fault memory display

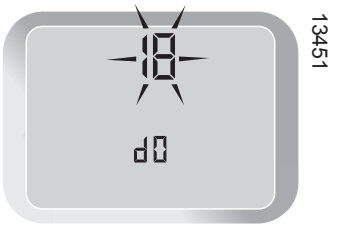
13.3 Diagnostic Menu

The Diagnostic Menu provides the ability to view and change certain parameters.
See Diagram 13.5 for available parameters.
To enter the diagnostic menu:
a) Press and hold the 'MODE' button for 5 seconds. The display will change to flashing '0'.
b) Use the '+' or '-' buttons to scroll to 96 (This is the installer level access password).
c) Press 'MODE' to confirm, see diagnostic display 1.



Diagnostic display 1

Use the '+' or '-' buttons to view the appropriate diagnostic number, see diagram 13.4.
If necessary the values can be changed by:
a) Pressing the 'MODE' button.
b) The diagnostic value flashes, see diagnostic display 2.



Diagnostic display 2

c) Use the '+' and '-' buttons to cycle through available values.
d) The change is saved by pressing 'MODE' once more.
(**NOTE:** Only certain parameters can be adjusted)
To exit the diagnostic menu press and hold the 'MODE' button for 5 seconds.

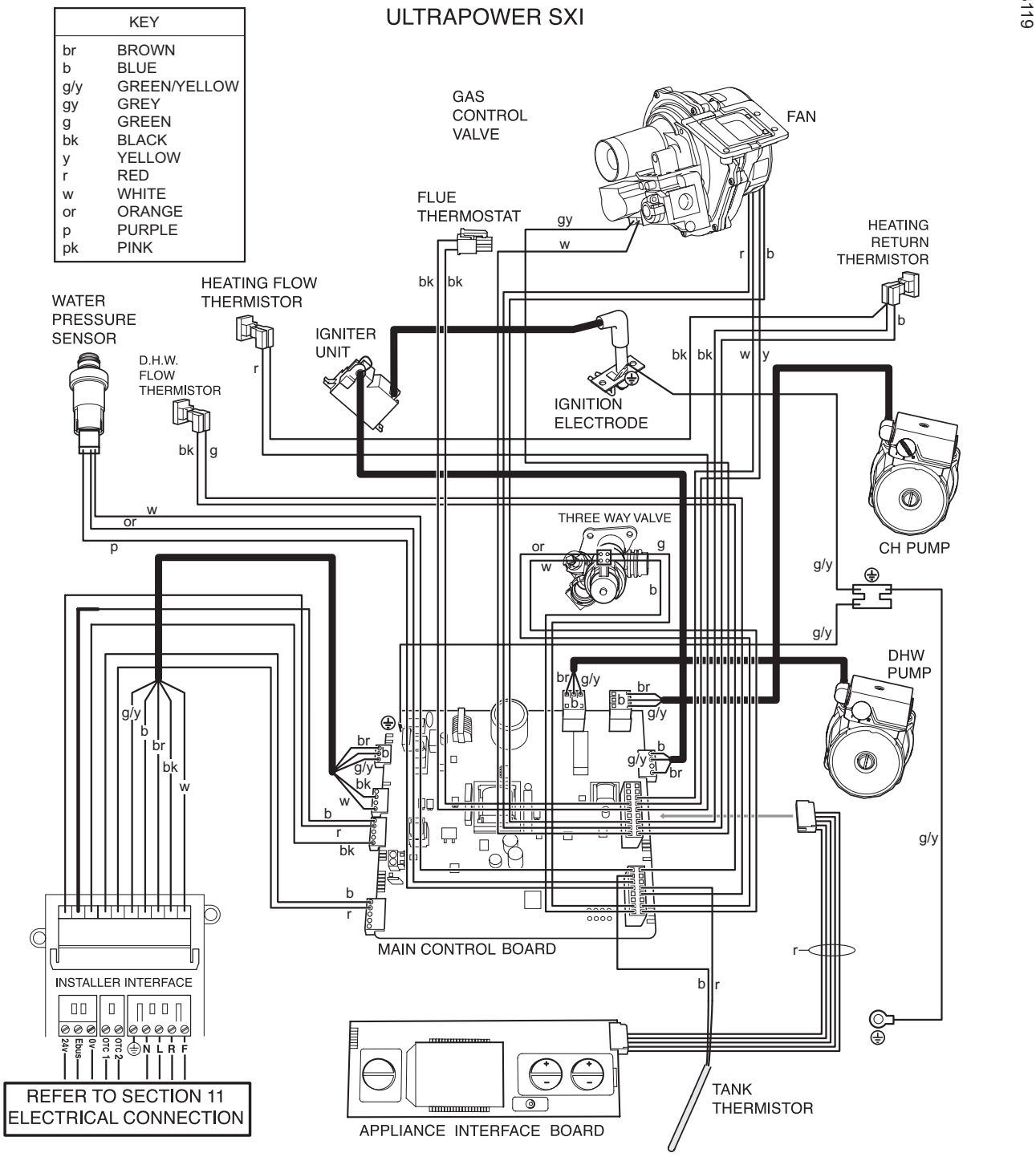
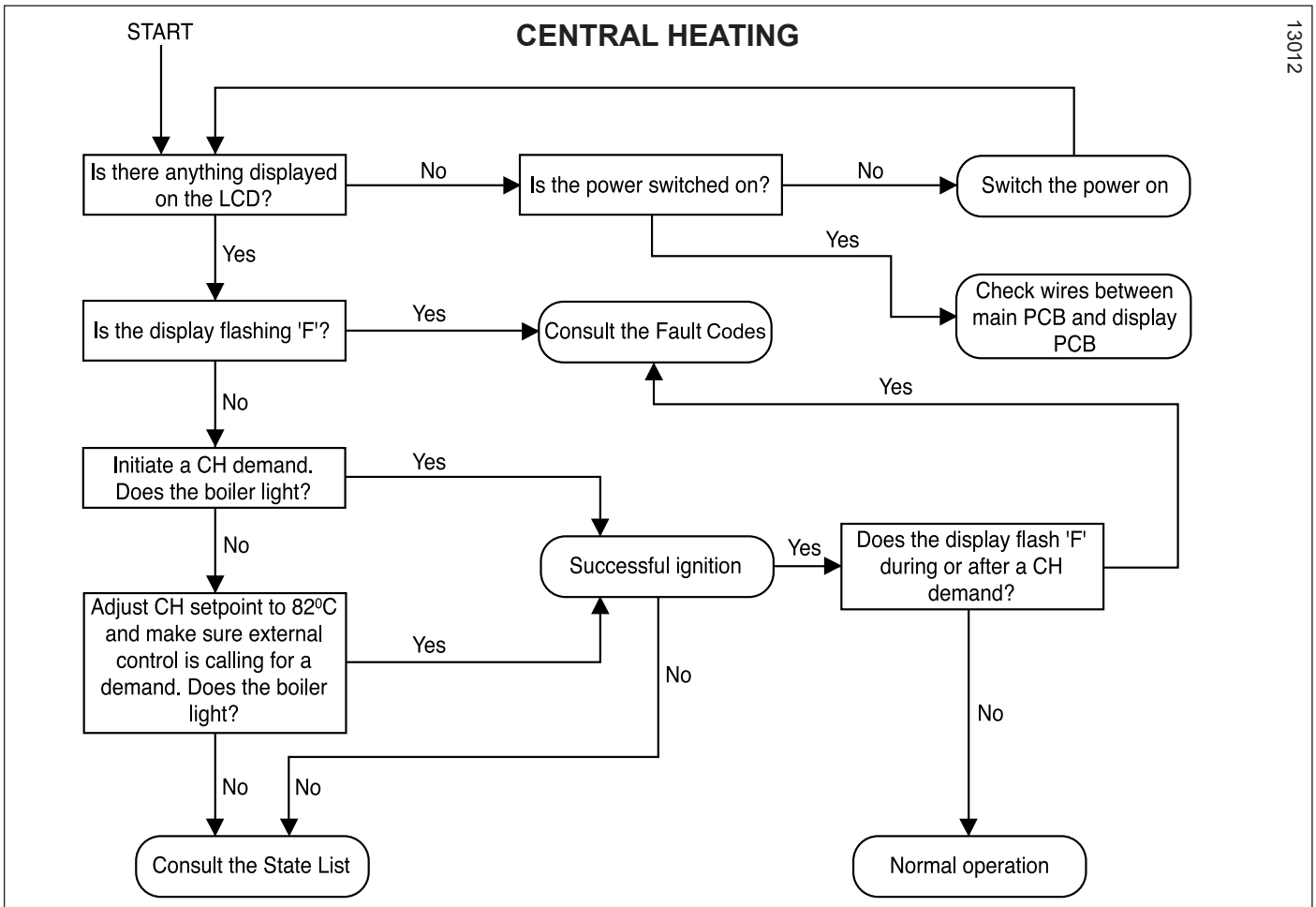

13119
ULTRAPOWER SXI
KEY
br BROWN
b BLUE
g/y GREEN/YELLOW
gy GREY
g GREEN
bk BLACK
y YELLOW
r RED
w WHITE
or ORANGE
p PURPLE
pk PINK
GAS CONTROL VALVE
FAN
FLUE THERMOSTAT
HEATING RETURN THERMISTOR
HEATING FLOW THERMISTOR
WATER PRESSURE SENSOR
D.H.W. FLOW THERMISTOR
IGNITER UNIT
IGNITION ELECTRODE
THREE WAY VALVE
CH PUMP
DHW PUMP
MAIN CONTROL BOARD
INSTALLER INTERFACE
24v Ebus 0v OTC 1 OTC 2 N L R F
REFER TO SECTION 11 ELECTRICAL CONNECTION
APPLIANCE INTERFACE BOARD
TANK THERMISTOR

Diagram 13.2


CENTRAL HEATING
13012
START
Is there anything displayed on the LCD?
No
Is the power switched on?
No
Switch the power on
Yes
Yes
Check wires between main PCB and display PCB
Is the display flashing 'F'?
Yes
Consult the Fault Codes
Yes
No
Initiate a CH demand. Does the boiler light?
Yes
No
Successful ignition
Yes
Does the display flash 'F' during or after a CH demand?
Adjust CH setpoint to 82°C and make sure external control is calling for a demand. Does the boiler light?
Yes
No
No
No
No
Consult the State List
Normal operation

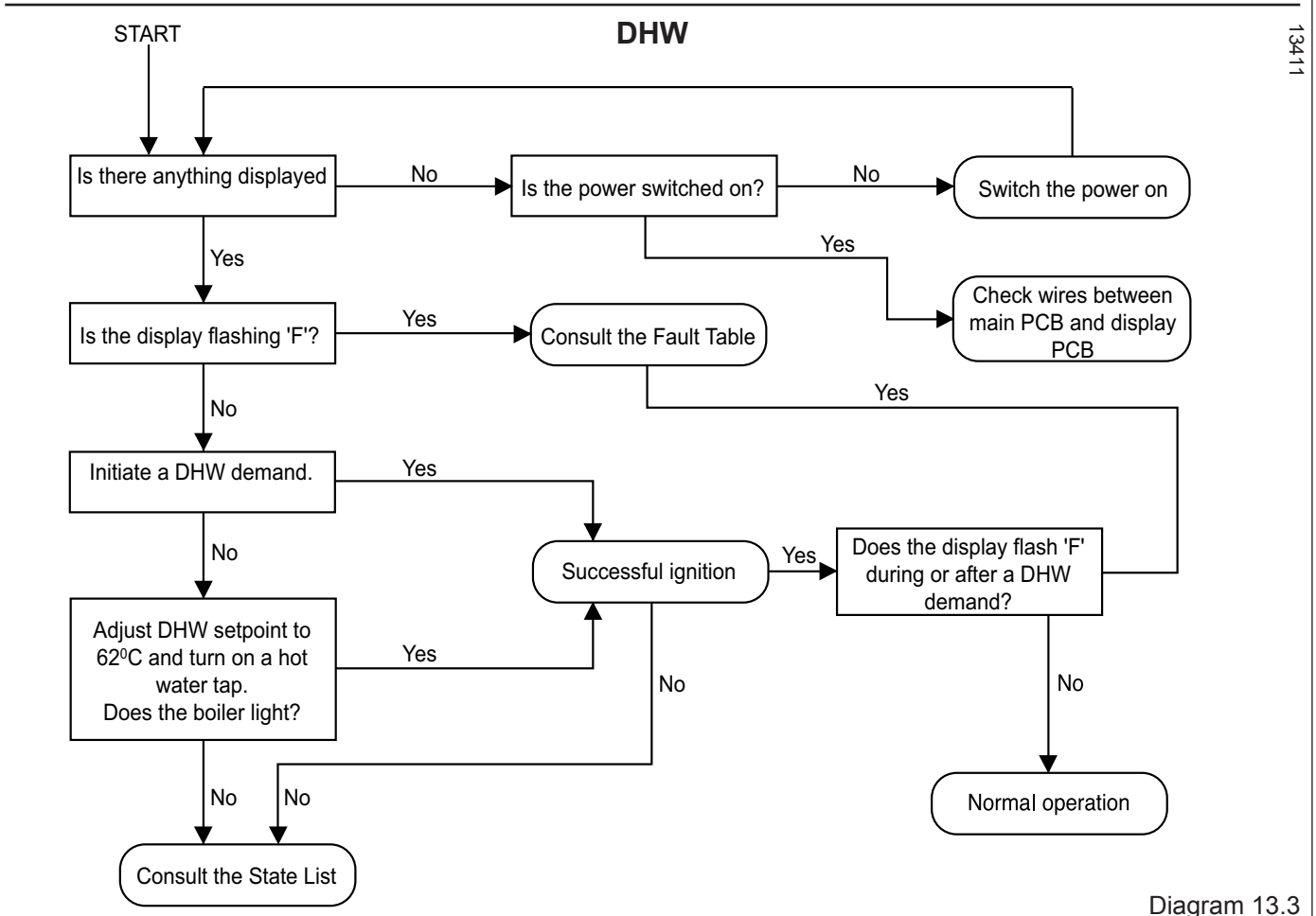

DHW
13411
START
Is there anything displayed
No
Is the power switched on?
No
Switch the power on
Yes
Yes
Check wires between main PCB and display PCB
Is the display flashing 'F'?
Yes
Consult the Fault Table
Yes
No
Initiate a DHW demand.
Yes
No
Successful ignition
Yes
Does the display flash 'F' during or after a DHW demand?
Adjust DHW setpoint to 62°C and turn on a hot water tap. Does the boiler light?
Yes
No
No
No
No
Consult the State List
Normal operation

Diagram 13.3

Fault Codes

13412

CODE	DESCRIPTION	POSSIBLE CAUSE
F1	Boiler has attempted to light 5 times and failed on all occasions	Gas tap is closed. Gas valve connector is loose, unconnected, faulty, or wires are trapped. Ignitor connectors are loose, unconnected, faulty, trapped. Faulty Ignitor. Low gas inlet pressure. Incorrect gas valve adjustment. Electrode Ignition leads loose, unconnected, faulty, trapped. Electrode broken, defective, or position incorrect. Air inlet blocked, flue inlet blocked, flue duct leaking. Earthing connection loose, disconnected.
F2	Overheat - Flue thermostat	Boiler has overheated.
F3	Fan fault	Fan speed incorrect. Fan connector loose, unconnected, faulty or wires trapped. Faulty fan.
F4	Flame goes out whilst lit during a demand	Gas tap is closed. Gas valve connector is loose, unconnected, faulty, or wires are trapped. Ignitor connectors are loose, unconnected, faulty, trapped. Faulty Ignitor. Low gas inlet pressure. Incorrect gas valve adjustment. Electrode Ignition leads loose, unconnected, faulty, trapped. Electrode broken, defective, or position incorrect. Air inlet blocked, flue inlet blocked, flue duct leaking. Earthing connection loose, disconnected. Check condense trap is not blocked, drain and clean as described in section 12.6.
F5	Overheat	Boiler has overheated – press reset button
F6	Central Heating Flow Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F7	DHW Thermistor connection fault	Thermistor wires unconnected, faulty or trapped.
F8	Tank Thermistor connection fault	Thermistor wires unconnected, faulty or trapped.
F9	Pressure	Water pressure Connector loose, unconnected, faulty or wires trapped. Water Pressure Sensor Faulty Pump ceased, faulty. No water in the system
F10	Central Heating Return Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F11	Flow and/or return NTC faulty	Thermistor wires unconnected, faulty, trapped.
F13	PCB Memory or sensing fault	Loose connections on Main PCB or display PCB. Central Heating Flow or Return Thermistor wires unconnected, faulty, trapped. Electrode Ignition leads loose, unconnected, faulty, trapped. Earthing connection loose, disconnected.
F14	Gas Valve control defective	Gas valve connector loose, wires unconnected, faulty or trapped. Faulty main board. Faulty gas valve.
F15	eBus Voltage failure	Short circuit on eBus, overload on eBus.

Diagram 13.4

13447

Fault Codes (continued)

F22	Low Water pressure or Ignition temperature rise too slow	Not enough water in the system. Central Heating Flow or Return Thermistor wires loose, faulty, trapped. Central Heating Flow or Return Thermistor not connected to pipe correctly Air in the system. Faulty pump or pump speed too fast.
F25	Central Heating Flow temperature rise too high during operation. Central Heating Return temperature rise or temperature difference too high during operation. Central Heating Temperature difference (between Flow and Return) too high during operation.	Check thermistors are connected to pipes correctly. Air in the system. System is too restrictive.
F43	Generic error	Check all electrical connections - internal & external
F70	Software incompatible	Telephone Group Service
F77	Condensate pump error (Option)	Trapped, faulty wiring, blockage in condensate pump.

NO DISPLAY or 'Er' displayed - Check connection from display PCB to main PCB connector X51

Diagram 13.4a

Diagnostic Menu - Level 1 Installer Access

13737

	Display	Description	Range
■	d.0	Heating part load	Adjustable heating part load in kW (factory setting: max. output)
■	d.1	Water pump over run time for heating mode	2 - 60 min (factory setting: 5 min)
■	d. 2	Max. burner anti cycling period at 20°C Flow temperature	3 - 60 min (factory setting: 20 min)
	d. 3	**Domestic hot water flow temperature reading**	in °C
	d.4	**Tank temperature**	in °C
	d.5	**Heating temperature setpoint**	In °C
	d.6	**Domestic hot water setpoint**	In °C
	d. 7	**Tank setpoint**	in °C
	d.8	External controls heat demand	0= no heat request (open) 1 = heat request (closed)
	d.9	Flow target temperature from external **intelligent control**	In °C
	d.10	Status internal heating pump	1,2 = on, 0 = off
	d.11	Status external heating pump	1 to 100 = on, 0 = off
	d.13	Hot water circulation pump (via accessory module)	1 to 100 = on, 0 = off
	d.22	**Domestic hot water demand**	1 = on, 0 = off
	d.23	Summer/Winter function	1 = Winter, 0 = Summer
	d.24	**System water pressure**	**in bar.**
	d.25	Hot water activation	1 = yes, 0 = no
■	**d.27**	**Option Relay 1**	**Reserved for future use**
■	**d.28**	**Option Relay 2**	**Reserved for future use**
	d.33	Fan speed target value	in rpm/10
	d.34	Fan speed actual value	in rpm/10
	d.35	Position of diverter valve	0 = Heating; 100 = Hot water; 40 = Centre position
	d.40	Flow temperature	Actual value in °C
	d.41	Return temperature	Actual value in °C
	d.44	Ionisation current	Actual value (10nA) **> 80 no flame < 40 good flame**
	d.47	**Outside temperature**	in °C
	d.60	Number of safety temperature limiter cut offs	Quantity
	d.61	Number of lock outs	Number of unsuccessful ignitions in the last attempt
	d.64	Average ignition time	In seconds
	d.65	Maximum ignition time	In seconds
	d.67	Remaining burner anti cycling time (block time)	**Minutes**
	d.68	Unsuccessful ignitions in the first attempt	**Ignitions / 100**
	d.69	Unsuccessful ignitions in the second attempt	**Ignitions / 100**
	d.76	Appliance variant (device specific number)	00 to 99
	d.80	Heating operating hours	in h
	d.81	Water heating operating hours	in h
	d.82	Cycles in heating mode	Quantity
	d.83	Cycles in hot water operation	Quantity
	d.90	Digital regulator status	1 = identified, 0 = unidentified (eBUS Address < = 1 0)
■	**d.91**	**Internal Programmer type**	**0:24 hour 1:7 day (default)**
■	**d.92**	**Enable/Disable Internal Programmer**	**0: CH Off, DHW Off** **1: CH Off, DHW On** **2: CH On, DHW Off** **3: CH On, DHW On (Default)**
■	d.97	Activation of the second diagnostic level	Password needed
	d.99	**State List**	**(see table opposite)**

■ Indicates read and write function - all other diagnostics are read only

Diagram 13.5

13.4 Status Codes

The status codes provide information about the current operating condition of the boiler and can be accessed through the diagnostic display, refer to diagram 13.6.

13605

State list - Accessed through Diagnostic Codes - Level 1, Installer Access d.99

STATE LISTS

	Central heating mode	Description
S.00	no heating required	
S.01	fan pre-run	
S.02	pump pre-run	
S.03	ignition	
S.04	burner on	NORMAL OPERATING STATE FOR CH
S.05	pump / fan overrun	
S.06	fan overrun	
S.07	pump overrun	
S.08	Anti cycling period	
	Tank Loading	
S.20	domestic hot water cycling mode active	
S.21	fan pre-run	
S.22	Pump pre run	
S.23	ignition	
S.24	burner on	NORMAL OPERATING STATE FOR TANK LOADING
S.25	pump / fan overrun	
S.26	fan overrun	
S.27	pump overrun	
S.28	Anticycling period	
	Special cases of status messages	
S.30	No Heating demand from external controls 230V	Check wiring in external controller. Check wiring at Installer Interface.
S.31	summer mode	Check CH setpoint / Check external controls
S.32	Antifreeze active – fan speed variation too high – waiting during blocking function	Check fan connection.
S.34	frost protection active (Priority 4)	Temperature below 8°C - check thermistor connection if this is not true.
S.36	No Heating demand from external controls 24V	Check wiring in external controller. Check wiring at Installer Interface.
S.42	Accesory Module is blocking burner operation	Check accessory module.
S.53	waiting time: temperature difference flow - return sensor too high (Check thermistor fit)	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.
S.54	waiting time: no water in system, temperature (gradient error) rise flow / return sensor too high	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.
S.76	Waiting period – pressure sensor	Check system pressure - default display.
S.96	Return-Sensor check is running, demand (DHW or heating) is blocked	Check return thermistor connection to pipe. Check harness connection to thermistor.
S.97	Water pressure sensor check is running, demand (DHW or heating) is blocked	Check connection to pressure sensor. Check pump has not seized.
S.98	Flow / Return - sensor check is running, demand (DHW or heating) is blocked	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.

Diagram 13.6

14 Replacement of Parts

14.1 General

Replacement of parts must be carried out by a **competent person** approved at the time by the Health and Safety Executive.

IMPORTANT: The following replacement of parts described in sections 14.7 to 14.12 and section 14.14 will require the removal of the burner module assembly and the replacement of seal and self locking nuts.

Replacement parts that have associated components that need replacing on removal, i.e. 'O' ring, seals, gasket, etc., will be supplied and should be fitted.

Before replacing any parts the boiler and immersion heater should be isolated from the mains electric supply and the gas should be turned off at the gas service isolation valve on the boiler, see diagram 11.1.

Unless stated otherwise parts are replaced in the reverse order to removal.

After replacing any parts always test for gas soundness and if necessary carry out functional test of the controls.

For replacement of parts the front casing panels will need to be removed.

The tank module front panel will need to be removed first to gain access to the boiler module front panel securing screws.

Remove the two screws on the underside of the panel and lift off, see diagram 12.2.

For ease of servicing, the control box and domestic expansion vessel can be moved into their service positions, this will improve access to hydraulic components, see diagrams 12.4 to 12.6.

Draining of Boiler Heating Circuit

To drain the boiler heating circuit, isolate the flow and return valves, see diagram 11.1.

Open the top tap on the filling loop to drain the boiler out through the filling loop hose.

After servicing or replacing parts open the heating flow and return isolating valves and refill, vent and pressurise the heating circuit, refer to section 11.3.

Close the drain valve and disconnect the hose.

Check for leaks.

Draining of Boiler Domestic Water Circuit

Drain the domestic water circuit by closing the cold-water isolation valve, see diagram 11.1.

Open one or more hot water taps to drain the hot water circuit.

After servicing or replacing parts open the cold-water isolation valve and slowly open a hot water tap to remove air. Close the hot water tap and check for any leaks.

14.2 Domestic Expansion Vessel

For access, refer to section 14.1.

Isolate the DHW inlet valve, see diagram 11.1 and drain through a domestic tap.

Loosen the locknut at the top of the vessel, see diagram 14.1.

To remove the expansion vessel slide forward out of its hanging bracket.

Remove the flexible hose from the expansion vessel by undoing the union nut and lock nut, see diagram 14.1.

Fit a new rubber seal in union nut on flexible hose.

Fit the replacement unit.

Refill, vent and pressurise the boiler.

Check for leaks.

14.3 Silencer assembly

For access, refer to section 14.1.

To aid access to the silencer and securing screw, slacken the locknut at the top of the domestic expansion vessel, see diagram 14.1 and slide the vessel forward out of its bracket and put in its service position, see diagram 12.6.

To remove, undo the securing screw and pull the silencer from the fan, this is a push fit so no tools or fixings are required for its removal or fitting, see diagram 12.7.

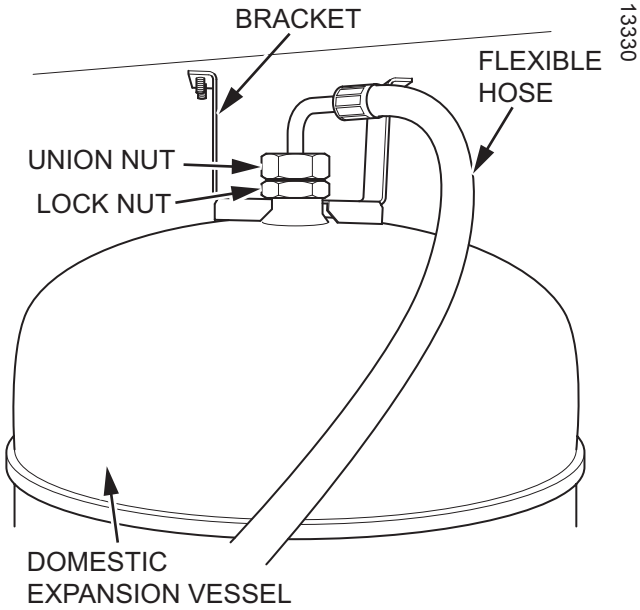


Diagram 14.1

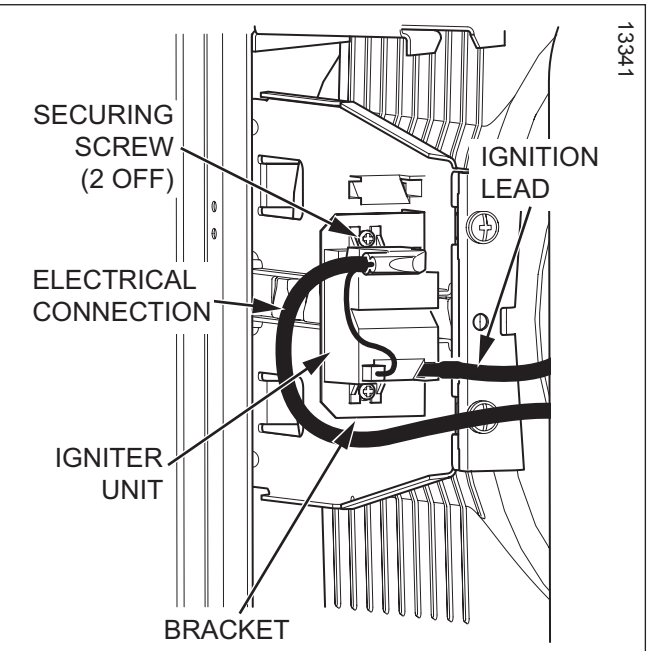


Diagram 14.2

14.4 Ignition Lead

For access, refer to section 14.1.

Refer to diagram 12.9.
Pull the spark plug style connector off the spark electrode and the ignition lead connected to the igniter unit, see diagram 14.2.

14.5 Igniter Unit

For access, refer to section 14.1.

To aid access to the igniter unit, loosen the locknut at the top of the domestic expansion vessel and slide forward out of its bracket and put into its service position, see diagrams 12.5 and 12.6.

Remove ignition lead and electrical connections then remove igniter unit by removing two securing screws, see diagram 14.2.

14.6 Spark Electrode

For access, refer to section 14.1.

Remove the spark plug ignition lead, earth lead, gasket and two securing screws. Withdraw the spark electrode carefully from the combustion chamber, see diagram 14.3.

Fit new gasket when replacing.

14.7 Gas Valve

For access, refer to section 14.1.

Remove the electrical plug from the gas valve, see diagram 12.10.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

Before removing the gas valve from the fan note its position and mark its orientation on the fan and gas valve bodies, this will help when re-assembling.

Remove the two screws that secure the gas valve to the fan, see diagram 14.4.

Remove the gas valve.

Fit new gasket when replacing.

After re-fitting check the combustion CO_2 and adjust if necessary, see section 12 Servicing.

After assembly test for gas soundness and purge in accordance with the current issue of BS6891or in IE, the current edition of I.S.813 “Domestic Gas Installations”.

14.8 Fan

For access, refer to section 14.1.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

Remove the two screws securing the fan to the gas valve.

Remove the fan.

Fit new gasket when replacing.

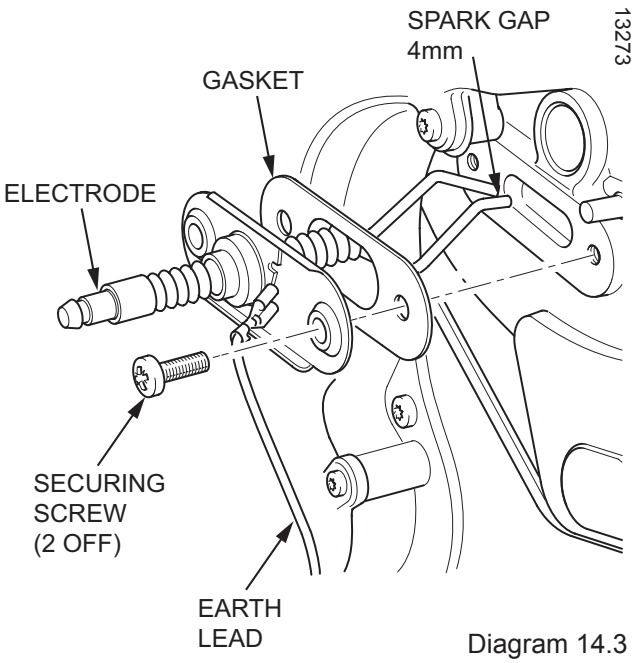


Diagram 14.3

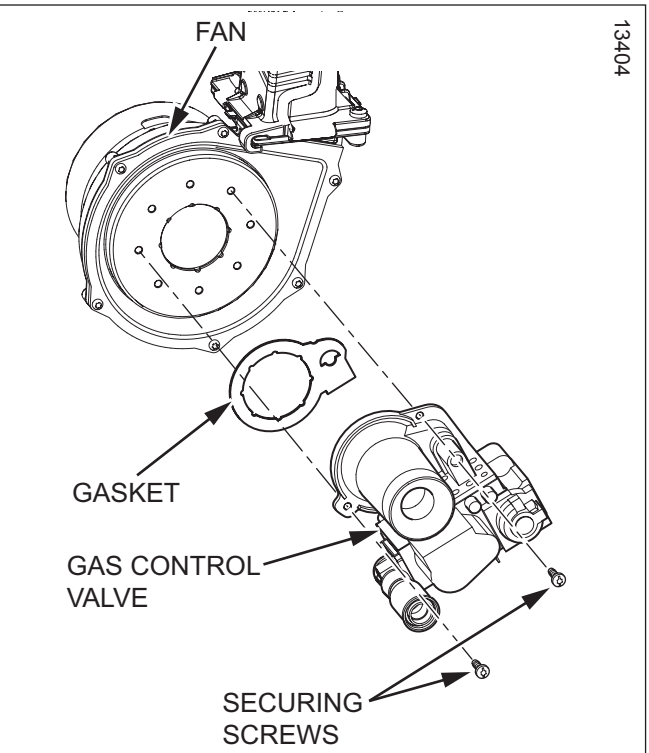


Diagram 14.4

14.9 Burner

For access, refer to section 14.1.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

Remove the four screws that secure the burner, see diagram 12.12.

NOTE: THE BURNER WILL REQUIRE A NEW GASKET WHEN REFITTED.

14.10 Front Insulation

For access, refer to section 14.1.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

Remove spark electrode, see section 14.6.

Remove burner as described in the appropriate section of 14.9 and withdraw the insulation, see diagram 12.12.

NOTE: THE BURNER WILL REQUIRE A NEW GASKET WHEN REFITTED.

14.11 Rear Insulation

For access, refer to section 14.1.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

Remove securing screw and washer in the centre of the insulation and withdraw insulation, see diagram 14.5.

14.12 Viewing Window

For access, refer to section 14.1.

Refer to diagram 14.6.

Remove circlip.

Remove steel washer.

Remove glass.

Remove fibre washer.

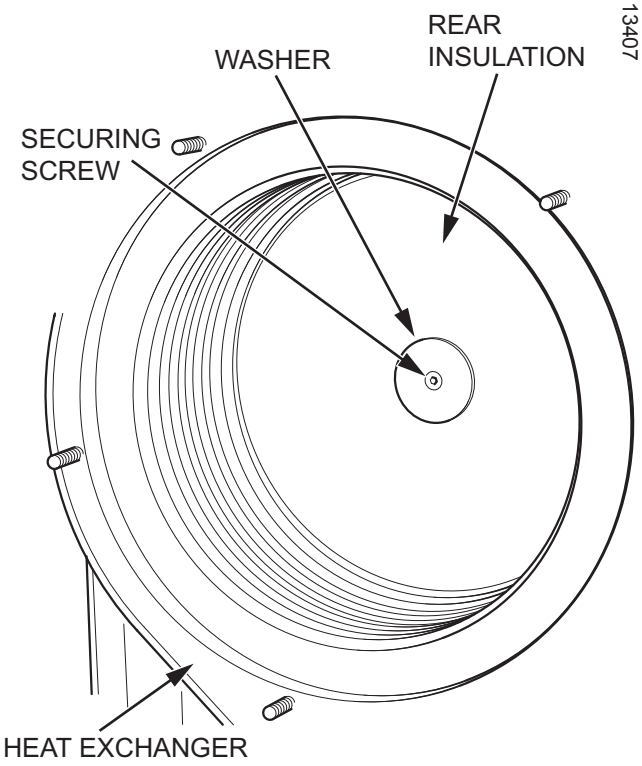


Diagram 14.5

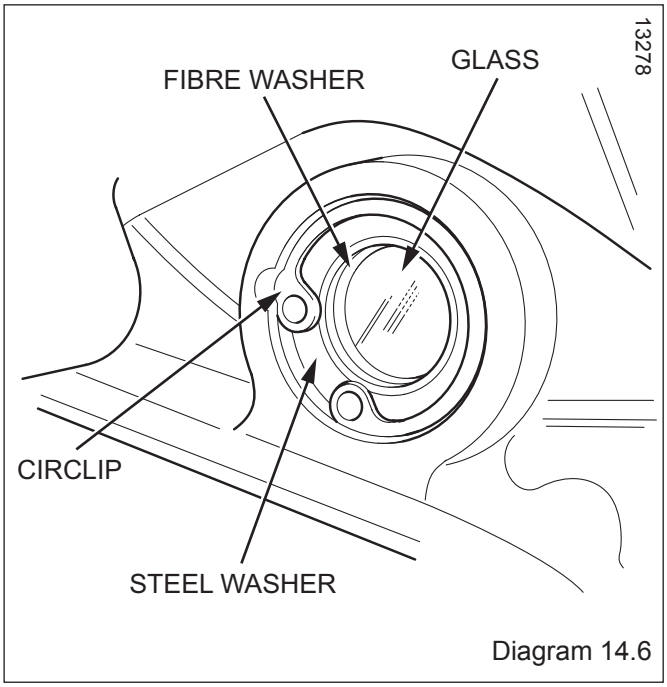


Diagram 14.6

14 Replacement of Parts

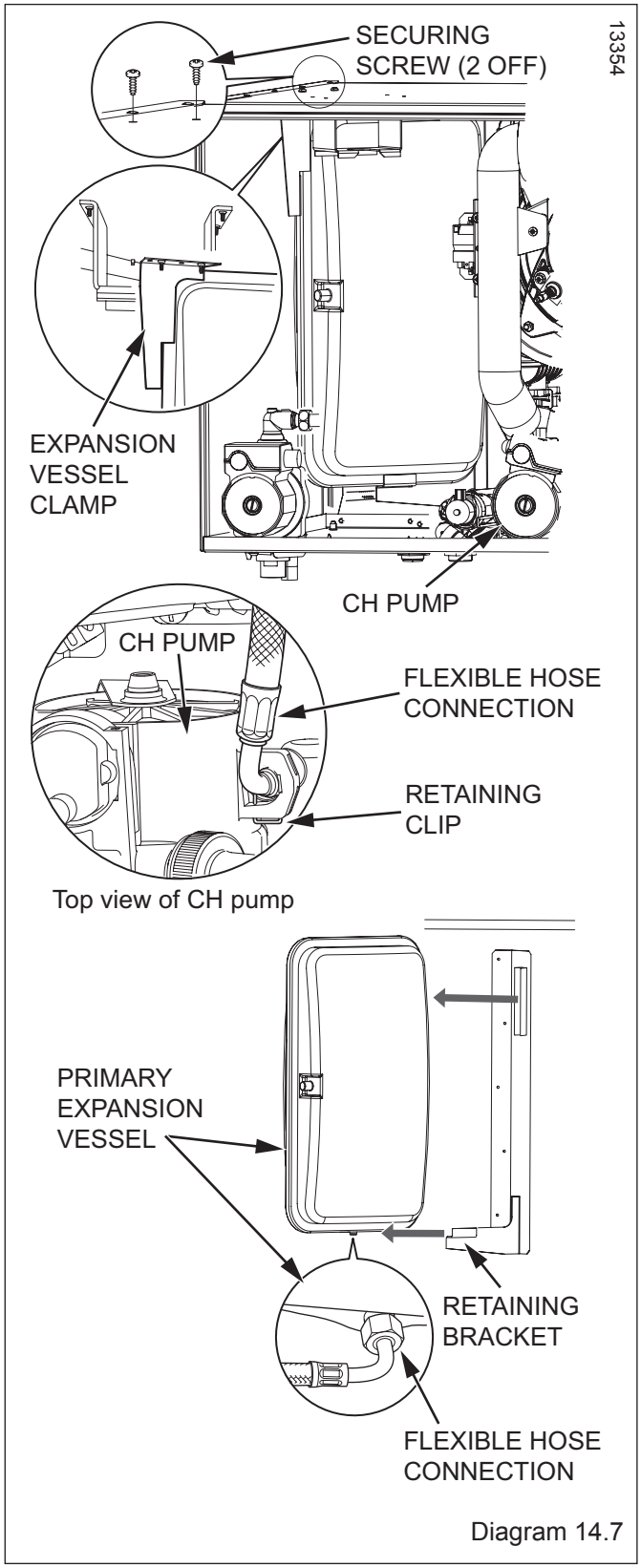


Diagram 14.7

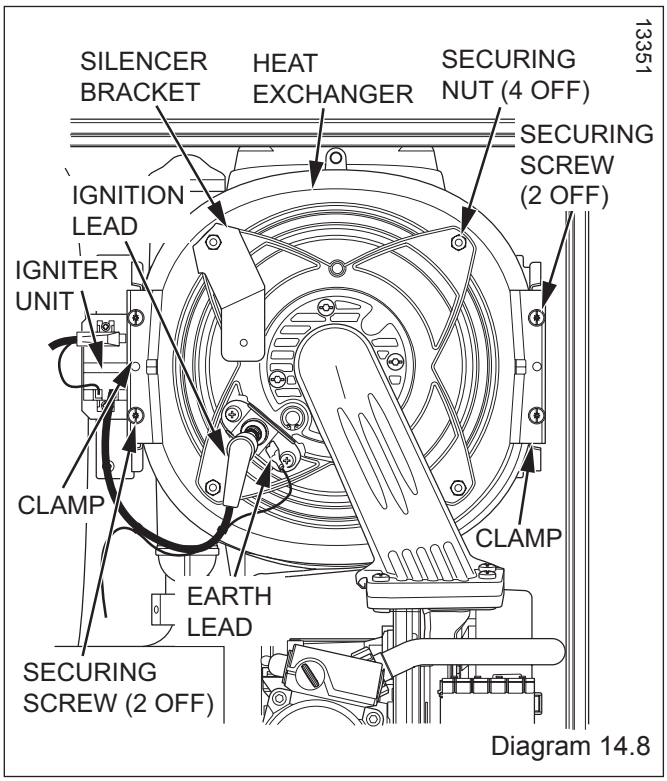


Diagram 14.8

14.13 Heating Expansion Vessel

For access, refer to section 14.1.

Drain the boiler heating circuit, refer to section 14.1.

Remove the retaining clip from the flexible hose at the central heating pump, see diagram 14.7.

Remove the flexible hose from the pump, ensure the ‘O’ ring on the connection is seated correctly before re-fitting.

Remove the expansion vessel clamp, see diagram 14.7.

Slide the expansion vessel forward and out from the retaining bracket.

Remove the flexible hose union nut from the expansion vessel. When re-fitting ensure that a new sealing washer is fitted and that the elbow of the flexible connection faces towards the front of the appliance.

14.14 Heat Exchanger

Refer to Manual Handling Operations, 1992.

For access, refer to section 14.1.

Drain the boiler heating circuit, see section 14.1.

Drain the boiler domestic water circuit, see section 14.1.

Disconnect the flue connection.

Remove the silencer, refer to section 12.2.

Remove the igniter unit electrical connections, refer to diagram 14.2.

Refer to section 12.4 for removal of the fan, gas valve and burner assembly.

14 Replacement of Parts

Remove the two connection clips securing the flow and return pipes to the heat exchanger, see diagram 14.9.

Move the pipes away from the heat exchanger.

Remove the four heat exchanger securing screws and clamps, see diagram 14.8.

CAUTION: There will be water in the heat exchanger.

Remove the push fit condense pipe from the bottom of the heat exchanger, see diagram 14.10.

Carefully remove the heat exchanger and disconnect the flue overheat thermostat, see diagram 12.11.

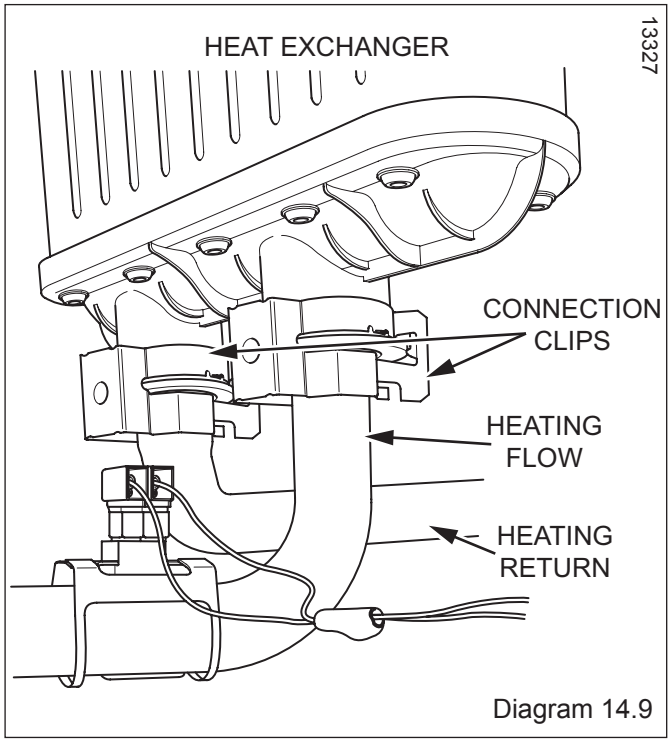


Diagram 14.9

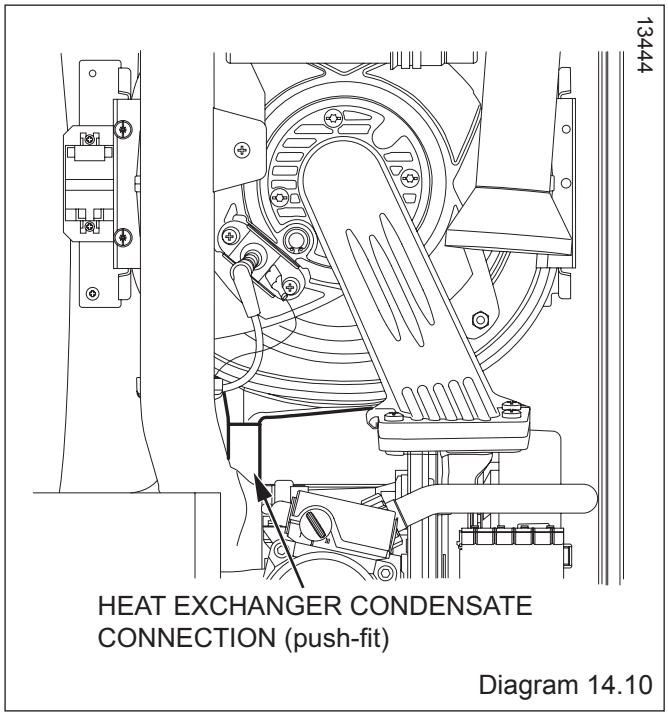


Diagram 14.10

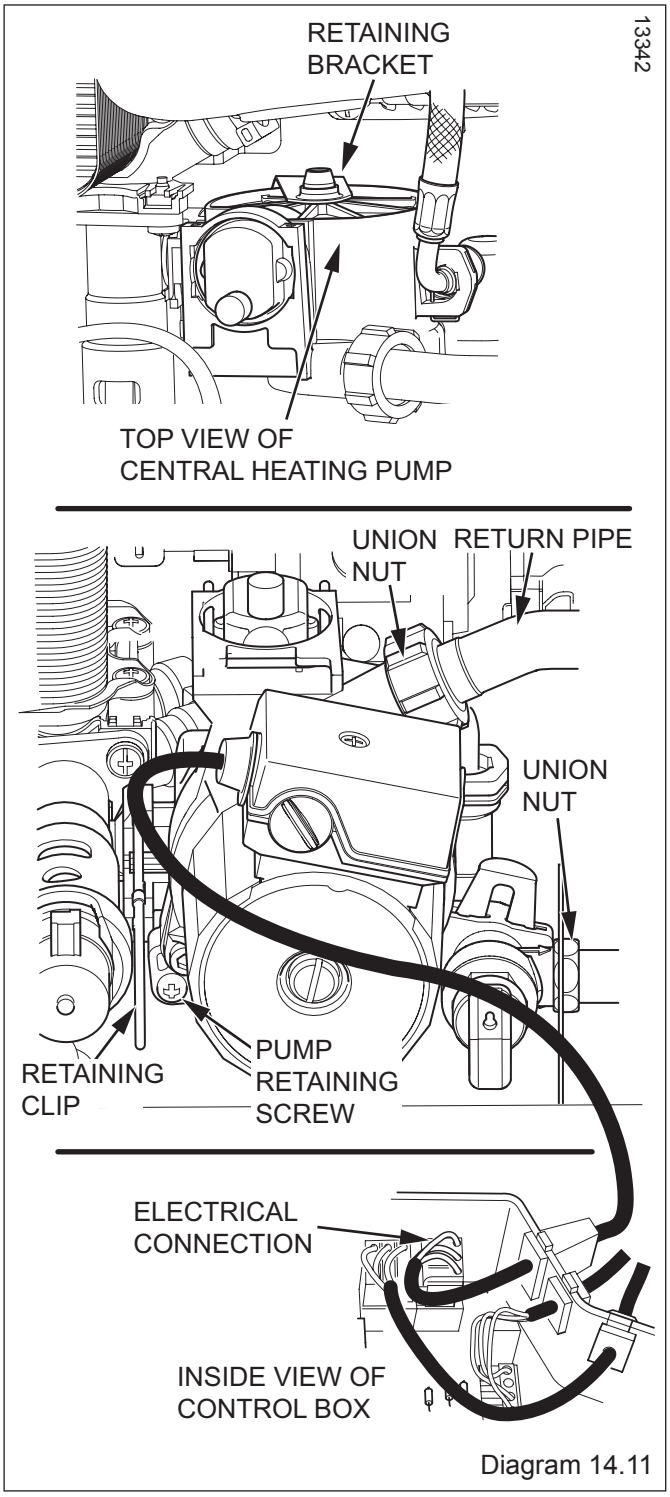


Diagram 14.11

14.15 Central Heating Pump

For access, refer to section 14.1.

Drain the boiler heating circuit, see section 14.1.

Unscrew the union nut of the return pipe to the pump connection, see diagram 14.11.

Unscrew the union nut from the safety discharge valve.

Remove the flexible connection from the CH pump, see diagram 14.7.

Disconnect the electrical connections inside the control box to the main PCB, see diagram 14.11.

Remove the securing screw from the pump retaining bracket and ease off the bracket from the spigot on the rear of the pump.

Remove the pump retaining clip.

The pump can now be pulled sidewards away from its three way valve connection.

When re-fitting, ensure that all seals are in place.

Always vent the pump after re-fitting.

14.16 Three Way Valve

For access, refer to section 14.1.

Remove the CH pump, refer to section 14.15.

Refer to diagram 14.12.

Remove the electrical plug.

Undo the CH inlet connection at the union nut between the boiler module and the tank module, remove the connector locknut.

Remove the retaining clip.

Remove the three securing screws.

Carefully remove the three way valve assembly.

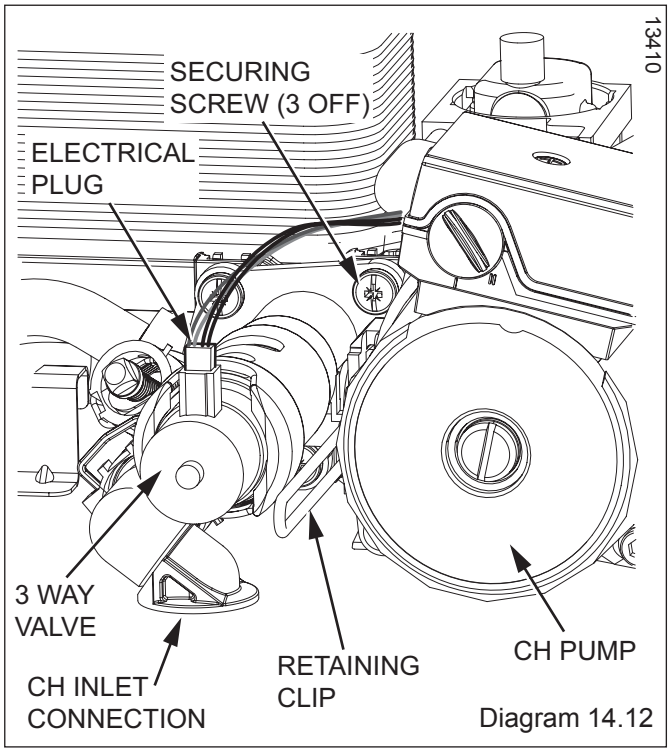


Diagram 14.12

14.17 Domestic Pump

For access, refer to section 14.1.

Drain the boiler domestic water circuit, see section 14.1.

Remove the domestic expansion vessel and place in its service position, see diagram 12.6.

Disconnect the electrical connection from the main PCB, see diagram 14.13.

Unscrew the union nut at the pump top connector to the DHW pipe.

Unscrew the pipe union nut from the bottom pump connection, see diagram 14.13.

Remove pump securing clip at the bottom pump connection. The pump can now be lifted up and clear of the boiler.

Remove the pump top and bottom connectors making note of the orientation of the top connection.

When re-fitting the top and bottom connectors ensure that the rubber seals are in place and that the top connector is orientated correctly, with the DHW pipe connection at 90^{O} to the pump axis.

When re-fitting any part, ensure that all seals and clips are in place.

Always vent the pump after re-fitting.

After replacing parts open the cold-water isolation valve and slowly open a hot water tap to remove air. Close the hot water tap and check for any leaks.

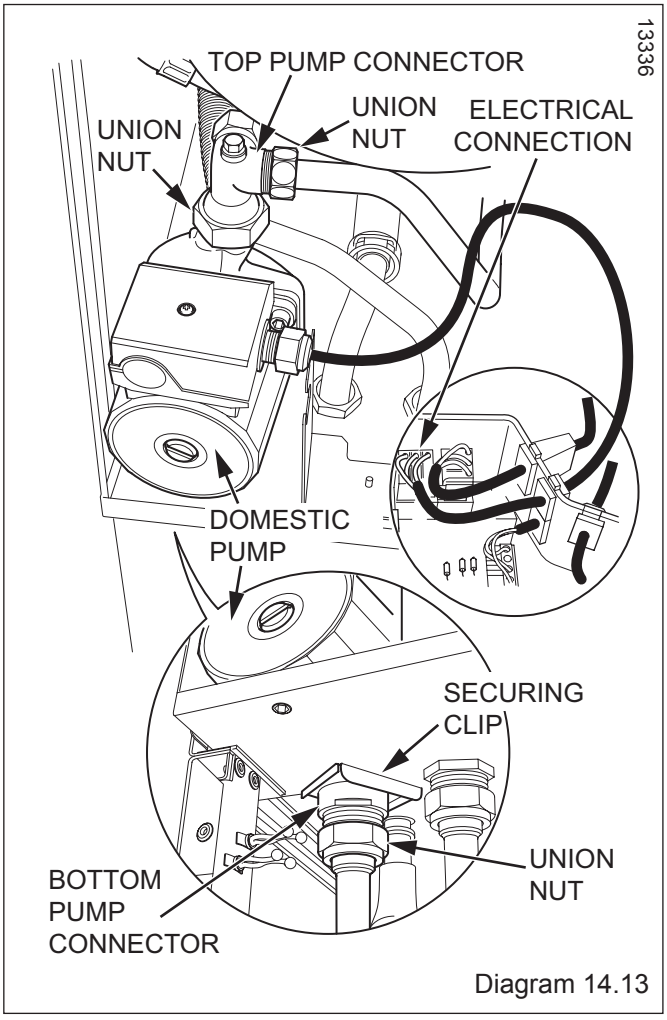


Diagram 14.13

14.18 Safety Discharge Valve

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler heating circuit.

The safety discharge valve is situated towards the RH side of the boiler module, refer to diagram 14.14.

Unscrew the pipework union nut from the safety discharge valve.

Remove the securing clip and withdraw the safety discharge valve.

Fit new ‘O’ ring.

14.19 Domestic Water Thermistor

For access, refer to section 14.1.

The domestic hot water thermistor is situated centrally in the boiler module on the DHW inlet pipe, refer to diagram 14.15.

Disconnect the domestic hot water thermistor electrical connections

Remove hot water thermistor.

NOTE: When reconnecting electrical connections, polarity is not important.

Carry out a functional test of the controls.

14.20 Heating Flow Thermistor

For access, refer to section 14.1.

The heating flow thermistor is situated underneath the heat exchanger, refer to diagram 14.16.

Remove the electrical connections from the thermistor.

Remove the thermistor noting its position on the flow pipe.

NOTE: When reconnecting, the polarity of the wiring to thermistors is not important.

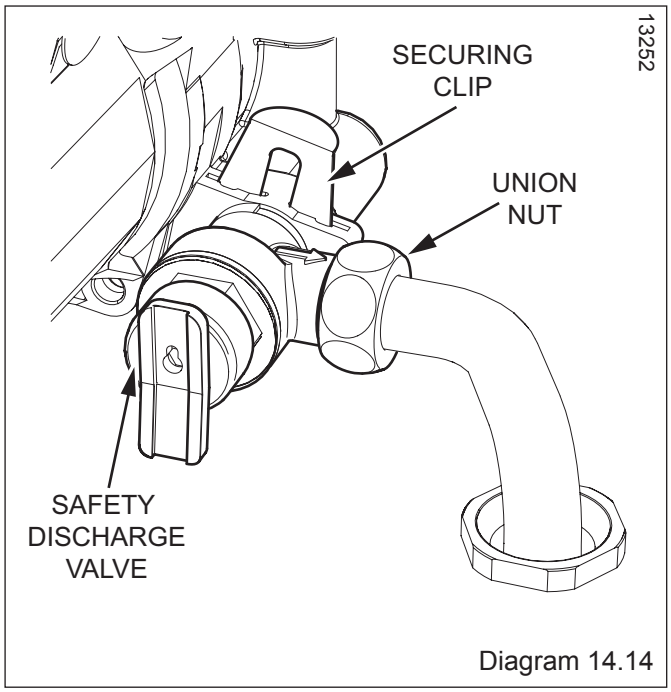


Diagram 14.14

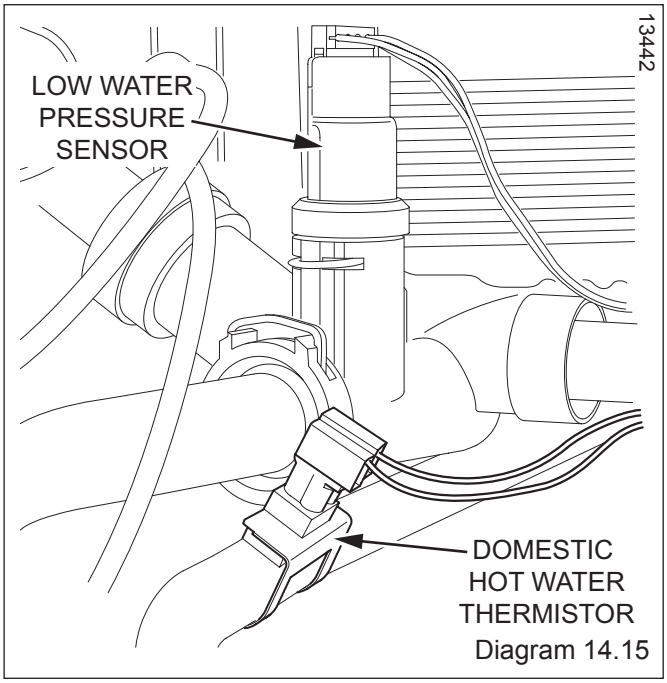


Diagram 14.15

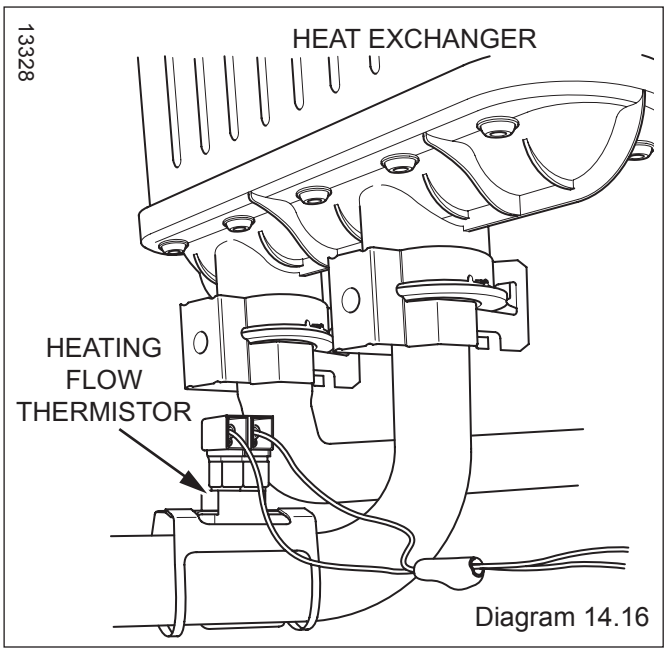


Diagram 14.16

14.21 Heating Return Thermistor

For access, refer to section 14.1.

Refer to diagram 14.17.

Remove the electrical connections from the thermistor.

Remove the thermistor and noting its position on the return pipe.

NOTE: When reconnecting, the polarity of the wiring to thermistors is not important.

14.22 Automatic Air Vent

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler heating circuit.

Refer to diagram 14.18.

Remove the retaining clip to release the automatic air vent.

Fit the new automatic air vent and ‘O’ ring ensuring the vent cap is left loose.

14.23 Water Pressure Sensor

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler heating circuit.

Refer to diagram 14.19.

Disconnect the electrical lead and withdraw the lead plug.

Remove the retaining clip to remove the low water pressure sensor.

Fit new 'O' ring.

14.24 Plate-to-Plate Heat Exchanger

For access, refer to section 14.1.

Refer to section 14.1 to drain the boiler heating circuit.

Refer to section 14.1 and drain the boiler domestic water circuit.

Refer to diagram 14.20.

Remove the four screws securing the plate-to-plate heat exchanger to the hydroblock.

There will still be water present so carefully pull the plate-to-plate heat exchanger upwards to remove.

When replacing the plate-to-plate heat exchanger ensure that the four rubber seals are fitted into the hydroblock.

NOTE: The plate-to-plate heat exchanger only fits one way.

Open the cold-water isolation valve and slowly open a hot water tap to remove air.

Close the hot water tap and check for any leaks.

Open the heating circuit isolation valves, re-pressurise the system as necessary.

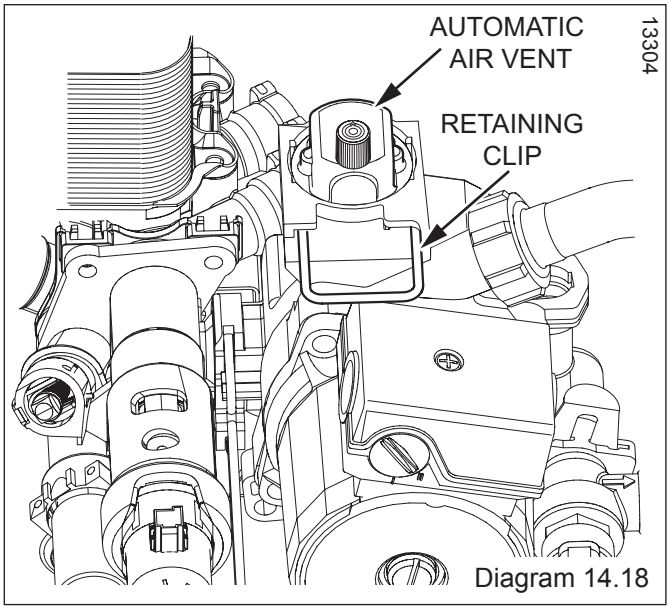


Diagram 14.18

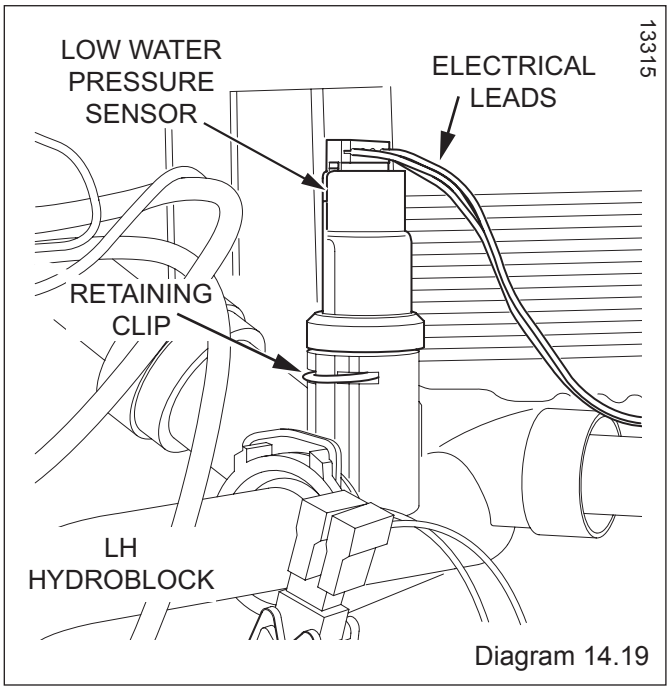


Diagram 14.19

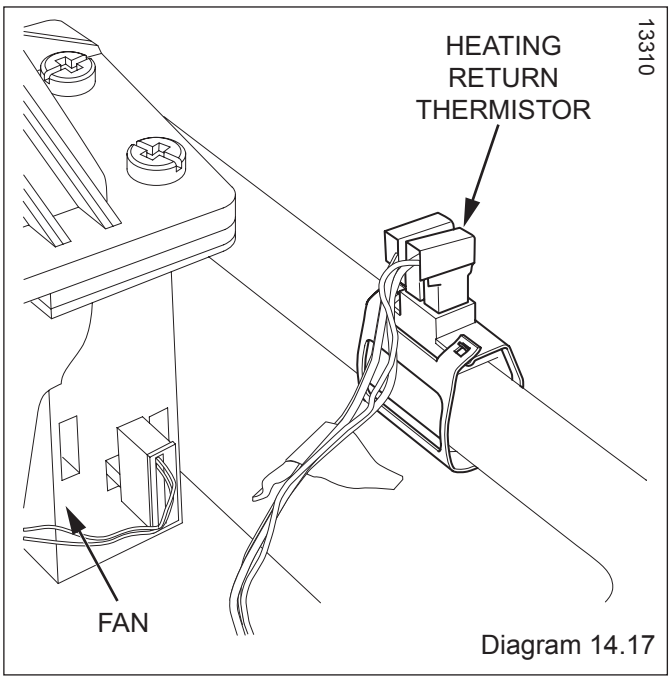


Diagram 14.17

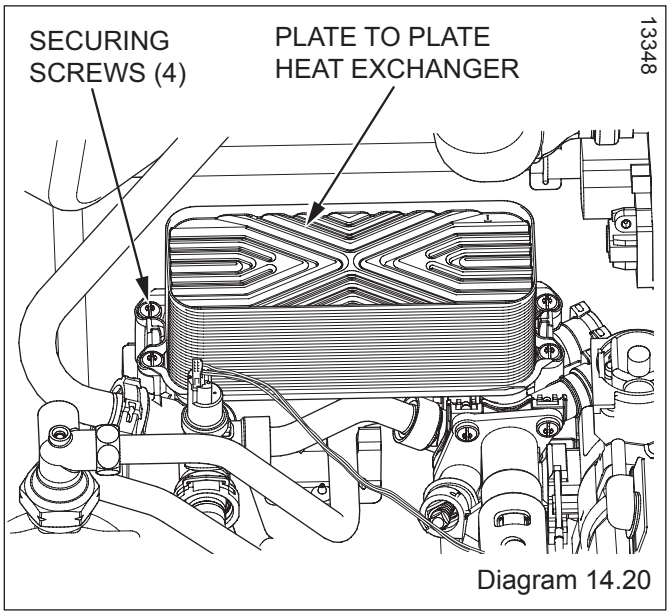


Diagram 14.20

14.25 Hydroblock and Bypass Tube

For access, refer to section 14.1.

IMPORTANT: To replace the bypass tube the LH and RH hydroblocks will need to be removed. The following procedure must also be used for the replacement of either the LH or RH hydroblock.

Refer to section 14.1 and drain the boiler heating circuit and the boiler domestic water circuit.

Isolate the gas supply at the gas service isolation valve, see diagram 11.1.

Remove the silencer, refer to section 14.3.

Remove the plate to plate heat exchanger, refer to section 14.24.

Remove the low water pressure sensor from the LH hydroblock, refer to section 14.23.

Remove clips from the plastic LH and RH hydroblocks retaining the DHW, DCW and primary flow pipes, see diagram 14.21.

Remove the heating flow pipe from the LH hydroblock.

Remove the CH filter from the heating flow pipe port in the LH hydroblock. The filter is a push-fit in the hydroblock port.

Undo the union nuts on the CH outlet pipe and gas pipe at the connections between the top and bottom modules.

Undo the locknuts retaining the CH outlet pipe and the gas pipe to the boiler chassis.

Rotate the gas pipe upwards and clear of the chassis panel.

Remove the 3 screws which retain the three way valve, refer to section 14.16.

Grip the LH and RH hydroblocks simultaneously and lift clear of the spigots on the mounting bracket. The RH hydroblock should be drawn upwards past the plastic three way valve body.

NOTE: Before removing the bypass tube from the hydroblocks, take note of the tube position and orientation.

Fit the new bypass tube with new 'O' ring seals and re-assemble to hydroblocks.

NOTE: Before lowering the assembly onto the bracket spigots, ensure that the two port axis in each hydroblock run parallel to each other and also that the bottom faces of the hydroblocks are level and aligned.

Lower the assembly onto the bracket ensuring that the brass washers on the DHW and DCW pipes are not displaced. Check also that the seals on the front of the RH hydroblock remain in place as it slides past the three way valve body. Before refitting the plate to plate heat exchanger ensure that the four rubber seals are in place, two in the LH and two in the RH hydroblock.

Fit new 'O' rings to pipes.

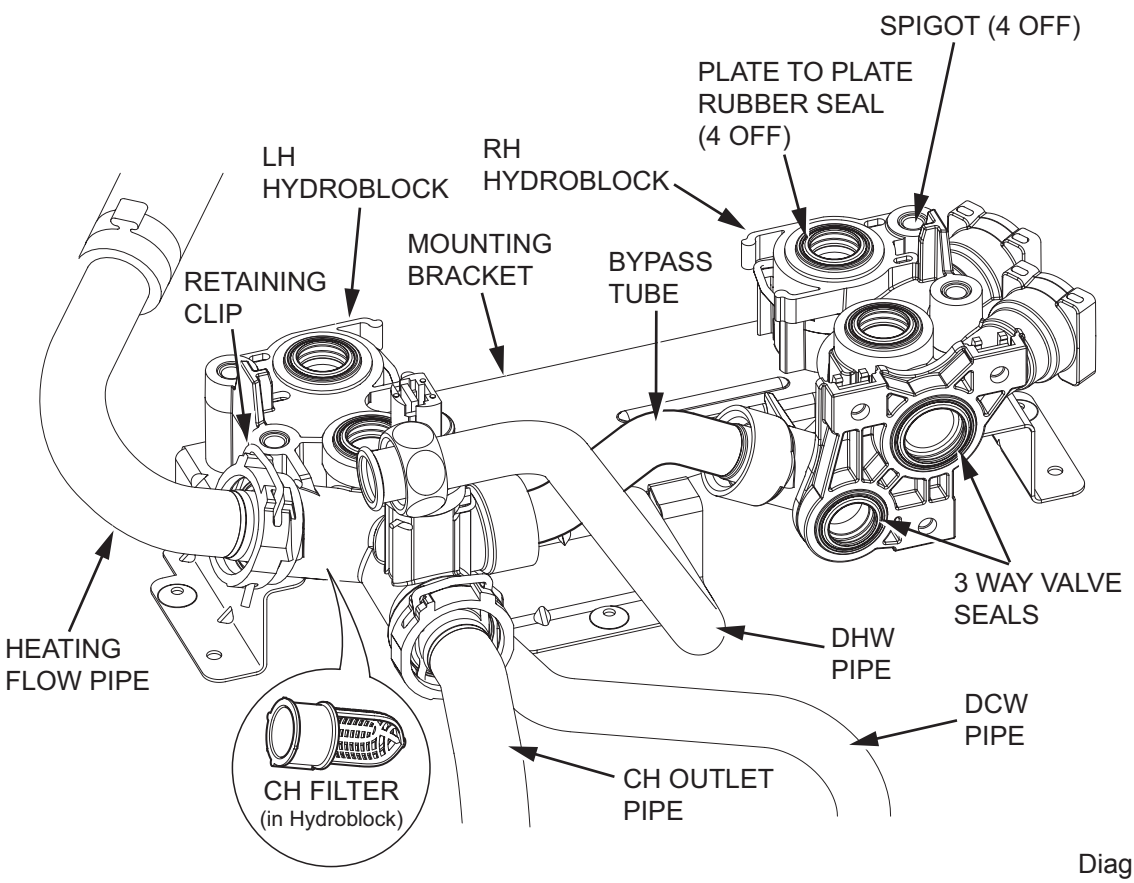


Diagram 14.21

14.26 Filling Loop

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler domestic water circuit.

Refer to diagram 11.3.

Undo the union nuts on the filling loop valve and the double check inlet valve to remove the filling loop.

Fit new 'O' rings.

After replacing the filling loop open the cold-water isolation valve and slowly open a hot water tap to remove air. Close the hot water tap and check for any leaks.

IMPORTANT: To comply with the water regulations the flexible hose must be disconnected from the double check inlet valve - undo the nut and pull the flexible hose from the valve.

14.27 Automatic Bypass Valve

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler primary circuit.

Refer to diagram 14.22.

Remove the retaining clip to remove the bypass valve.

Fit new 'O' rings.

Replace the bypass valve, refill, vent and pressurise the boiler.

Adjust the bypass as described in commissioning, see section 11.8.

14.28 Pressure Reducing Valve

For access, refer to section 14.1.

Refer to diagram 14.23.

Slacken the three screws securing the pipe retaining bracket, see diagram 8.3.

Undo the union connection at the isolation valve and then the union nuts to remove the reduced pressure zone valve.

Fit new 'O' rings.

14.29 Safety Relief Valve

For access, refer to section 14.1.

Refer to diagram 14.23.

Undo the two nuts securing the safety relief valve pipe and remove.

Loosen the grub screw to remove the safety relief valve.

14.30 Temperature and Pressure Relief Valve

For access, refer to section 14.1.

Refer to section 14.1 and drain the boiler hot water circuit.

Refer to diagram 14.24.

Undo the union nut on the right hand side of the valve and disconnect pipe, unscrew the valve body to remove.

Apply the sealant supplied before replacing the relief valve.

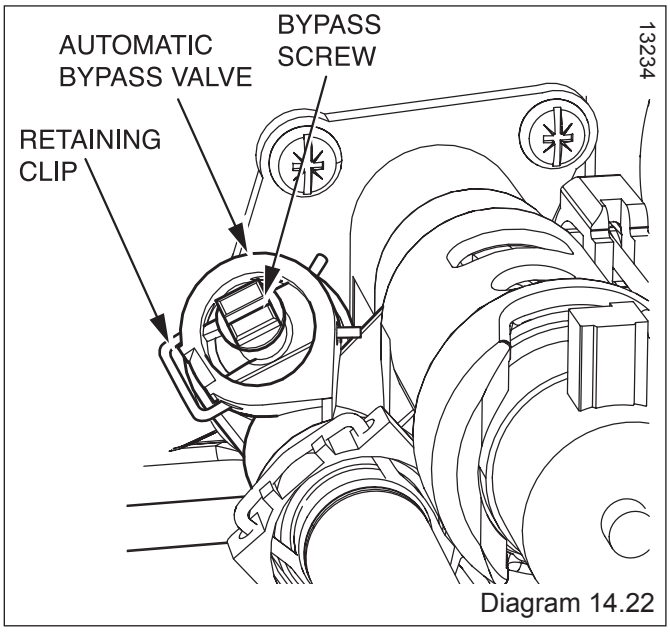


Diagram 14.22

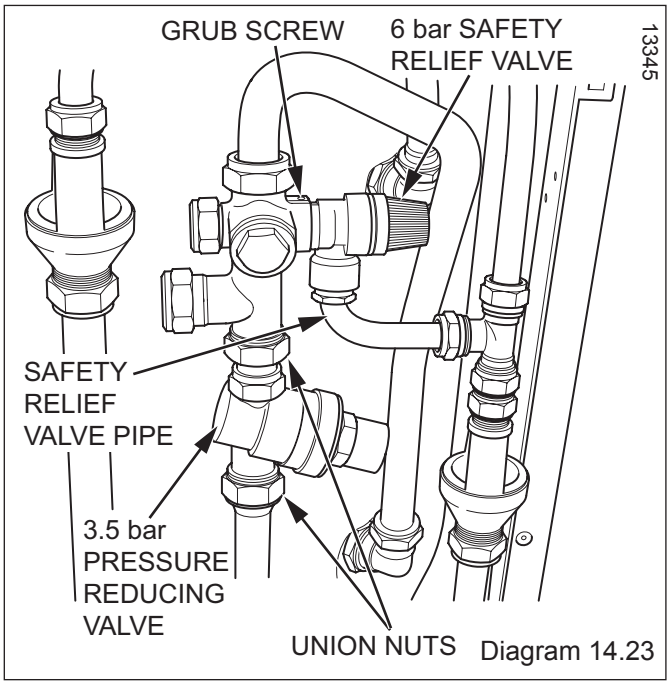


Diagram 14.23

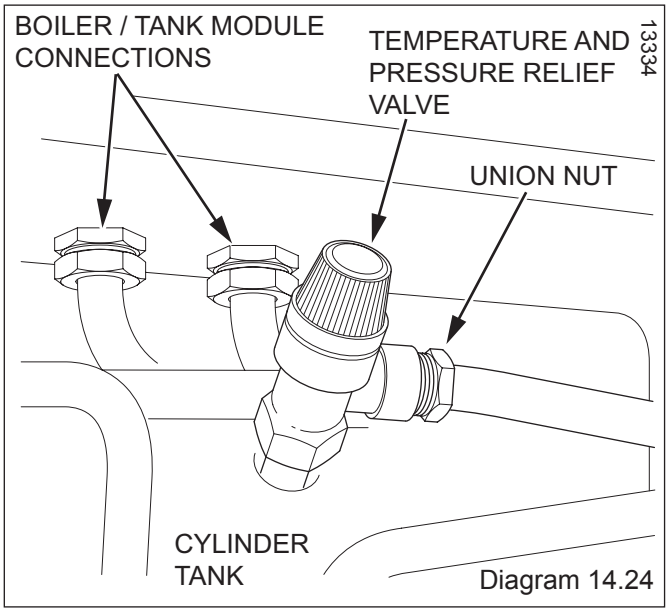


Diagram 14.24

14.31 Immersion Heater

For access, refer to section 14.1.

Refer to section 5.3 and drain the hot water storage tank.

Remove the flexible condensate hose from the condensate trap and siphonic drain, see diagram 12.14.

Isolate any electrical connections to the immersion heater.

Unscrew the large locknut holding the immersion heater in place on the hot water tank, see diagram 14.25.

Remove immersion heater and gasket.

When replacing the immersion heater a new gasket is also supplied.

14.32 Condense Trap & Siphonic Drain

For access, refer to section 14.1.

Remove the flexible condensate hose by pulling out of condense trap and siphonic drain, see diagram 12.14.

Refer to diagram 14.26.

Remove the securing screw holding the trap/drain.

Remove the float to clean it. When replacing, ensure that the float is inserted correctly as shown in diagram 14.26.

Flush water through the trap/drain to remove any remaining solids.

Check for any debris in the outlet pipe of the condense trap and siphonic drain and clean as necessary.

Reassemble and refit.

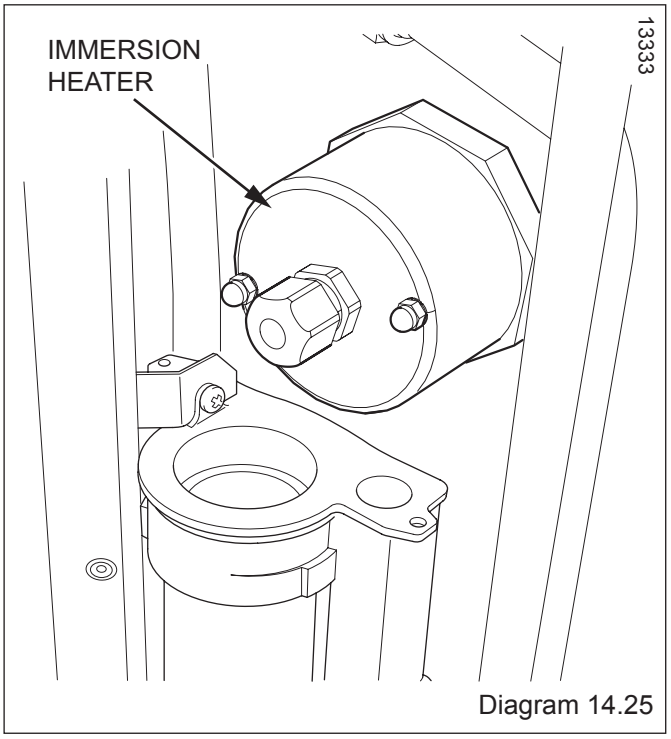


Diagram 14.25

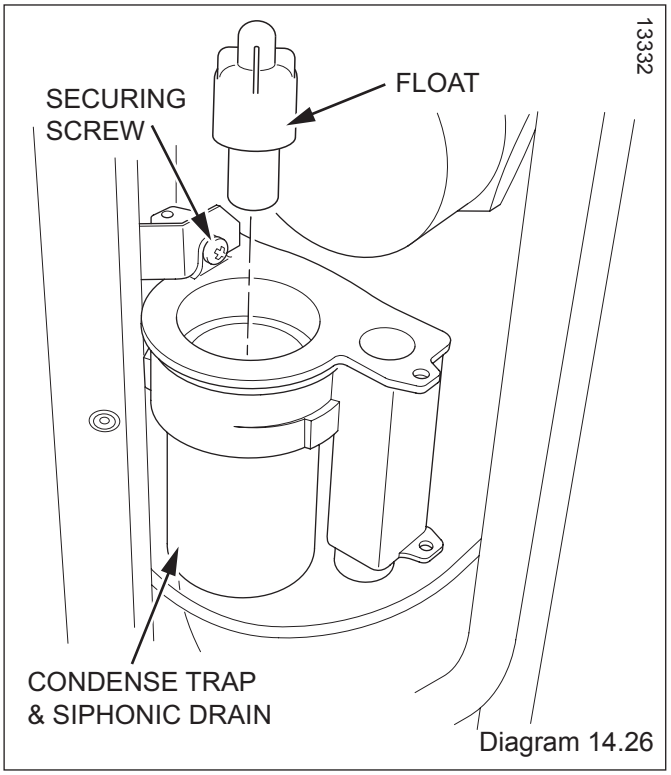


Diagram 14.26

14.33 Access to Control Box Internals

For access, refer to section 14.1.

Carefully pull the control box forwards so that it lies horizontally in its hinges.

Do not allow the front of the control box to swing down and be loosely held by its electrical connections.

Release the four retaining clips, see diagram 14.27, to remove the rear cover and gain access to the electrical connections, main PCB and appliance interface PCB.

14.34 Main PCB

For access, refer to section 14.33.

Remove the electrical connections to the PCB.

Ease back the four PCB retaining clips and withdraw the PCB from the retaining lugs, see diagram 14.28.

When refitting the control box cover ensure the leads do not become trapped.

14.35 Fuse, Main PCB - Control Box

For access, refer to section 14.33.

The fuse is located at top left hand side of the main PCB, see diagram 14.28.

14.36 User Interface

Refer to section 14.33 for access.

Remove the main PCB, refer to section 14.34.

Remove the electrical connection.

Gently ease back the retaining clips, see diagram 14.29.

Withdraw the board.

When replacing the board refer to instructions supplied with replacement PCB.

14.37 Boiler Module Front Casing Panel Seal

Remove the seal and thoroughly clean the casing surface before fitting the new seal, see diagram 12.15.

Refit the casing panel.

NOTE: Ensure the seal is fitted correctly giving an airtight joint.

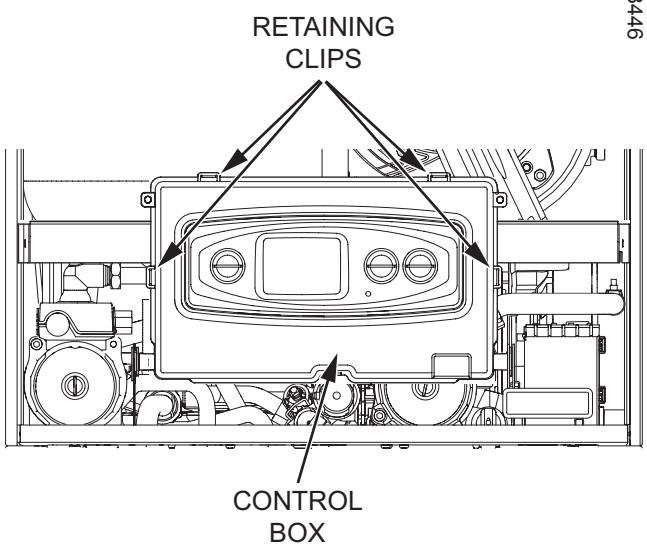


Diagram 14.27

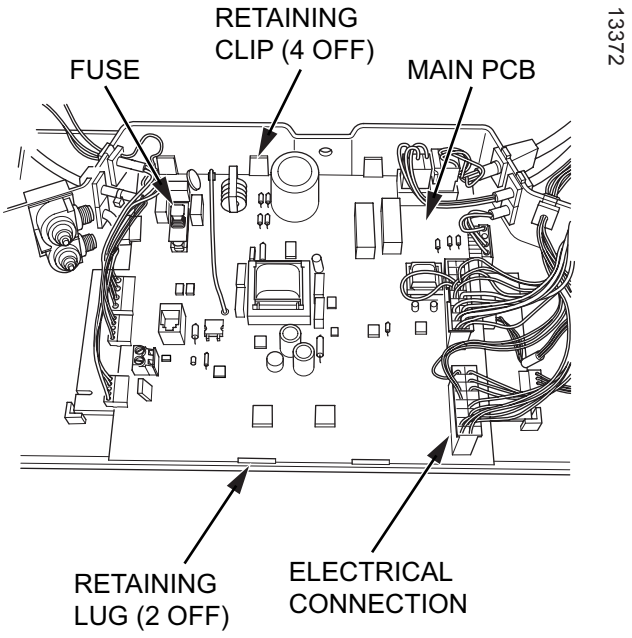


Diagram 14.28

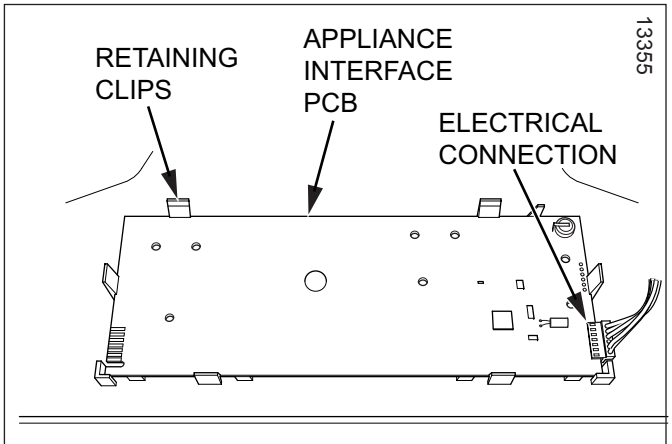


Diagram 14.29

15 Spare Parts

15.1 Spare Parts

When ordering spare parts, contact Glow-worm's own service organisation using the telephone number on the inside front cover of this booklet. Please quote the name of the appliance and serial number, to be found on the data label. If ordering from British Gas also quote the G.C. number of the part.

Key No.	Part No.	Description	GC Part No.
1	0020038232	Plate to Plate Heat Exchanger	H52-547
2	0020020763	Igniter Unit	H42-773
3	0020014160	DHW Thermistor	H36-325
4	2000801840	Burner	E88-867
5	0020014161	Automatic Air Vent	H42-754
6	0020018812	Burner Door Seal Kit	H49-385
7	0020020781	Flow/Return Thermistor	H42-792
8	0020014171	Central Heating Pump	H42-760
9	0020014173	Safety Discharge Valve	H42-758
11	0020037668	Main PCB	H52-597
12	0020038183	Primary Expansion Vessel	H52-505
13	0020038257	Domestic Expansion Vessel	H52-591
14	0020038167	Temperature & Pressure Relief Valve	H52-529
15	0020038209	NTC	H52-540
16	0020038275	Water Pressure Switch	H52-545
17	0020038166	Immersion Heater	H52-507
18	0020038182	6 bar Safety Relief Valve	H52-532
19	0020038071	Gas Valve	H52-565
20	0020038069	Fan	H52-563
21	0020038061	Appliance Interface	H52-596
22	0020018810	Electrode	H49-383
23	0020038245	Domestic Pump	H52-554
24	0020038175	Bypass	H52-492

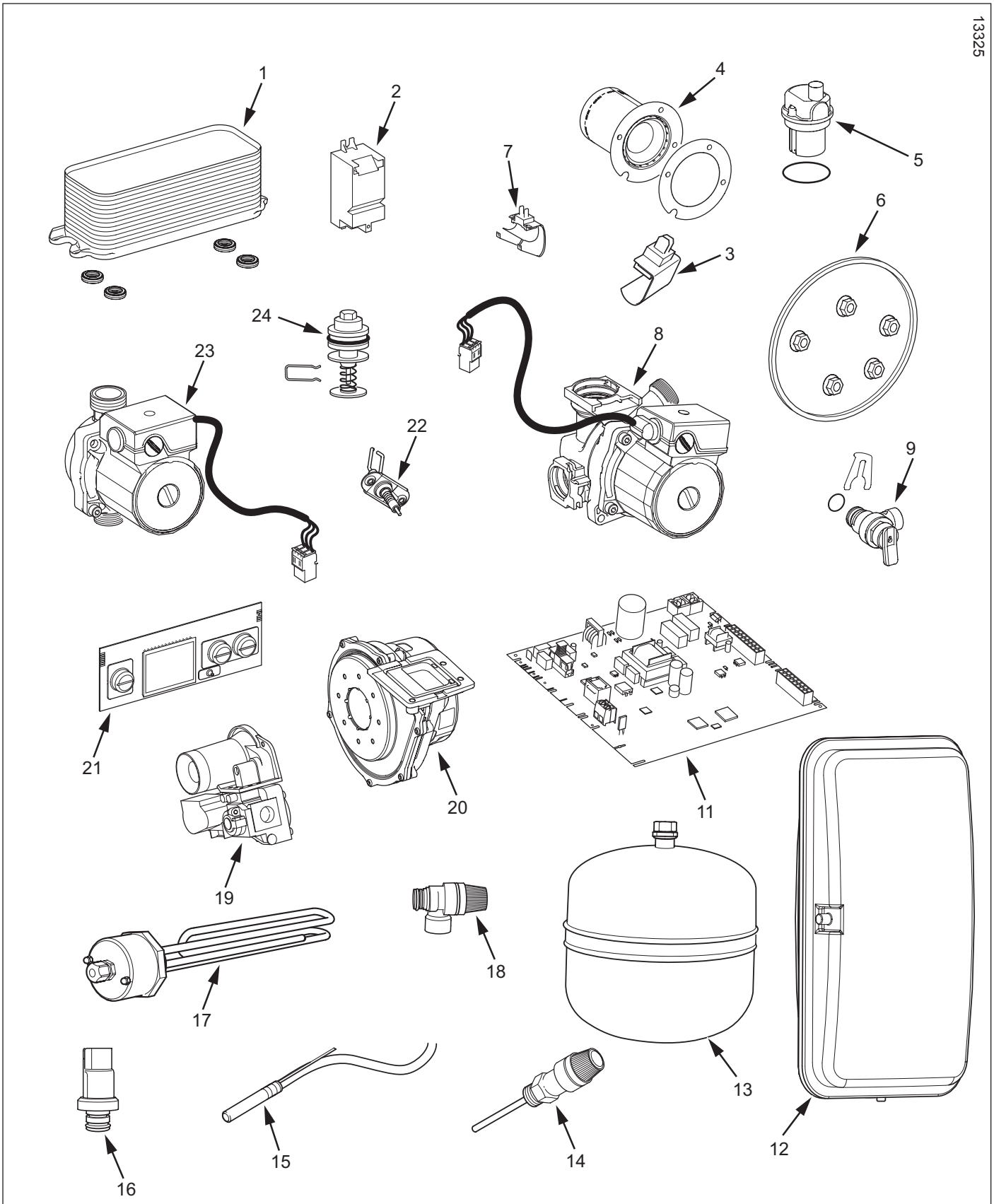


Diagram 16.1

EC declaration of conformity

Name and Address of the manufacturer:	**Nottingham Road** **Belper, Derbyshire DE56 1JT**
Identification of product:	Glow worm :- Ultrapower, Condensing Floor Standing Combination Storage Boiler
Appliance type:	100 sxi & 170 sxi

The appliance types satisfy the essential requirements of the relevant directives and Standards:

90/396/EEC including amendments
"Directive on the approximation of the law of the member states relating to appliances burning gaseous fuels"

Designed and built to CE-type examination certificate:

PIN no: **87BR40**

92/42/EEC including amendments
"Directive of efficiency relating to boiler burning gaseous fuels"

Designed and built according to European Standards:

73/23/EEC including amendments
"Directive on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits"

89/336/EEC including amendments
"Directive on the approximation of the law of the member states relating to electromagnetic compatibility "

EN 483
EN 677
EN 625
EN 60335-1
EN 60529
EN 50165
EN 55014
EN 61000-3-2
EN 61000-3-3

Any change to the appliance and/or any use not according to the instructions will lead to the invalidation of this Declaration of Conformity

Belper September 2006	S. Keeton	A. Beardsley
(place, date)	Program Manager S. Keeton	Certification Manager A. Beardsley

Glow-worm - Nottingham Road - Belper - Derbyshire - DE56 1JT

H:\Work Data\Delaration of Conformity\Dec Ultrapower.doc/10.12.2001/shr

BENCHMARK LOG BOOK
SERIAL NUMBER Model Name

Please affix the label positioned on the top panel of your boiler over this area.

PEEL OFF

COMMISSIONING CHECKLIST
GAS BOILER SYSTEM

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Commissioned by *(print name)* _____ Engineer ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate *:

Building Regulations Notification Number *(if applicable)* _____

CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating	Room Thermostat and Programmer/Timer ☐	Programmable Room Thermostat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐
Time and Temperature Control to Hot Water	Cylinder Thermostat and Programmer/Timer ☐			Combination Boiler ☐
Heating Zone Valves	Fitted ☐			Not Required ☐
Hot Water Zone Valves	Fitted ☐			Not Required ☐
Thermostatic Radiator Valves	Fitted ☐			Not Required ☐
Automatic Bypass to System	Fitted ☐			Not Required ☐
Boiler Interlock				Provided ☐

ALL SYSTEMS

The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions Yes ☐

What system cleaner was used? _____

What inhibitor was used? Quantity _____ *litres*

CENTRAL HEATING MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (if applicable) _____ mbar OR Gas Inlet Pressure _____ mbar

Central Heating Flow Temperature _____ °C

Central Heating Return Temperature _____ °C

COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes ☐ No ☐

If yes, has a water scale reducer been fitted? Yes ☐ No ☐

What type of scale reducer has been fitted? _____

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (at maximum rate) _____ mbar OR Gas Inlet Pressure (at maximum rate) _____ mbar

Cold Water Inlet Temperature _____ °C

Hot water has been checked at all outlets Yes ☐ Temperature _____ °C

Water Flow Rate _____ *l/min*

CONDENSING BOILERS ONLY

The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798 Yes ☐

ALL INSTALLATIONS

If required by the manufacturer, record the following CO_2 _____ % OR CO _____ *ppm* OR CO/CO_2 Ratio _____

The heating and hot water system complies with the appropriate Building Regulations Yes ☐

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes ☐

The operation of the boiler and system controls have been demonstrated to and understood by the customer Yes ☐

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

www.centralheating.co.uk

SERVICE INTERVAL RECORD

It is recommended that your heating system is serviced regularly
and that you complete the appropriate Service Interval Record Below .

Service Provider. Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer's instructions. Always use the manufacturer's specified spare part when replacing all controls.

SERVICE 1 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 2 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 3 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 4 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 5 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 6 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 7 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 8 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 9 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

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SERVICE 10 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

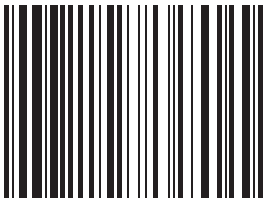
Company Name

Telephone Number

Engineer ID Number

Comments

Signature



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Because of our constant endeavour for improvement, details may vary slightly from those shown in these instructions.

Glow-worm, Nottingham Road, Belper, Derbyshire. DE56 1JT